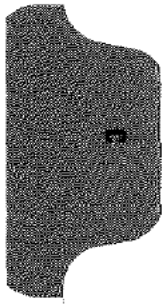

# UNION CARBIDE CORPORATION
# UCAR CARBON COMPANY

Lakewood, OH

ENSR

## CLOSURE PLAN FOR PAD C

**ENSR Consulting and Engineering**

**March 1989**

**Document Number 6900-048**

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# 1.0 INTRODUCTION

## 1.1 Objective of the Document

On April 15 and 28, 1988, Union Carbide Corporation's UCAR Carbon Company (UCAR) received letters from the EPA and OEPA respectively, requesting the submission of a Part B Permit application for the UCAR facility's hazardous waste storage facilities. In a letter dated September 27, 1988, UCAR stated the intentions of closing these facilities while in interim status and operating them under generator status, thereby eliminating the need to prepare and submit a Part B Permit application.

UCAR maintains this position and intends to close the hazardous waste container storage area, known as Pad C, under interim status.

This document details the methods by which UCAR will attain clean closure of the hazardous waste storage facility known as Pad C.

## 1.2 Overview of RCRA Closure Requirements

Regulations promulgated by the U.S. Environmental Protection Agency (EPA) on May 19, 1980 and January 12, 1981, and later amended on May 2, 1986, under the authority of the Resource Conservation and Recovery Act (RCRA) require owners/operators of hazardous waste management facilities (HWMFs) to prepare a plan that describes in detail the procedures and identifies the associated estimated costs to formally close HWMFs. The owner or operator of a HWMF is required to comply with the closure and post-closure provisions as specified in 40 CFR 265 Subpart G.

This closure plan outlines the procedures and costs associated with the closure of the container storage area known as Pad C at the UCAR facility in Lakewood, Ohio. The plan was developed based upon the closure performance standard specified

in 40 CFR 265.111 which states that HWMFs must be closed in a manner that:

a) Minimizes the need for further maintenance;

b) Controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere; and

c) Complies with the closure requirements of 40 CFR 265, Subpart G.

The closure regulations do not stipulate a specific format for closure plans, however, all plans must provide certain minimum information (40 CFR 265.112 (b)):

1) A description of how each HWMF at the facility will be closed according to the closure performance standard;

2) A description of how final closure of the facility will be conducted, including an estimate of the maximum extent of the operations which will be unclosed during the active life of the facility;

3) An estimate of the maximum inventory of wastes in storage or treatment at any time, and a description of methods to be used during closure for removing, transporting, treating, and storing of hazardous waste;

4) A description of steps necessary to decontaminate the facility or render it nonhazardous at closure;

5) A description of other activities necessary during closure to ensure that it satisfies the closure performance standards; and

6) A schedule for final closure activities.

The purpose of the closure cost estimation requirements is to determine the amount of financial assurance needed. The closure cost estimate is based upon the methods of closure described in the closure plan. It must account for managing the maximum inventory expected as indicated in the closure plan. A

cost estimate for a given activity must include all costs of supervision, fuel, and maintenance costs for the equipment used, administrative costs, and provisions for contingencies. Administrative costs include all costs associated with taxes and insurance, as well as costs of routine administration, paperwork, and reporting. The closure cost estimate must be based upon the costs for a third party to close the facility. It may not incorporate any salvage value of hazardous wastes, facility structures or equipment, or land at the time of closure.

Upon approval of the Ohio EPA Director and/or U.S. EPA Administrator, UCAR may amend the closure plan/cost estimate when closure costs are more clearly defined.

With the submission of this plan, UCAR is notifying the State Commissioner and/or EPA Regional Administrator in writing at least 180 days prior to the expected date of final closure.

UCAR will remove all hazardous wastes in storage from the site in accordance with the approved closure plan within 90 days after receiving the final volume of hazardous waste. UCAR will complete partial and final closure activities 180 days after receiving the final volume of hazardous wastes, or within 180 days after approval of the closure plan, if that is later. The Director and/or Administrator may approve a longer closure period if UCAR complies with all applicable requirements for requesting a modification to the permit and demonstrates: (1) that the closure activities will take longer than 180 days to complete, and (2) that all steps have been taken to eliminate any significant threat to human health and the environment from the unclosed but inactive facility.

Within 60 days of completion of final closure, certification by an independent registered professional engineer that the facility has been closed in accordance with the approved closure plan must be submitted to the State Director and/or the EPA Regional Administrator. This certification will be signed by UCAR and the independent registered professional engineer. Documentation supporting the engineer certification will be

available upon request until UCAR has been released from the financial assurance requirements.

## 1.3 Organization and Use of Document

This document has been organized to provide the EPA/OEPA with the procedures that UCAR will follow to comply with RCRA closure requirements.

The document has been structured to facilitate the review process of the EPA/OEPA. The document begins by describing the UCAR facility and the HWMF to be closed in Sections 2.0 through 4.0. Following this description, closure-related information is provided in Sections 5.0 through 8.0. Additional administrative information, such as closure cost estimates and financial assurance along with closure certification are provided in Sections 10.0 through 12.0.

# 2.0 FACILITY DESCRIPTION

## 2.1 Facility Location

The UCAR plant is a manufacturing facility located in Lakewood, Ohio. The plant is situated within 22 acres of land bordered by Madison Avenue to the north, West 117th Street to the east, Amtrak railroad to the south, and Magee Street to the west. The entire facility is enclosed by a security fence. Entrance to the plant is from the guard station located along Madison Avenue. Figure 2-1 is a plot plan of the facility.

## 2.2 Manufactured Products

The UCAR plant has three major product lines which include: Karbate, GRAFOIL®, and Boron Nitride ceramic products.

Karbate is impervious graphite which consists of graphite and resins. It has been produced at the UCAR plant since 1937. In June 1988, the Karbate process was sold.

GRAFOIL® is flexible graphite made from graphite flake. The graphite flakes are treated, furnaced, and then rolled into sheets of graphite. GRAFOIL® has been replacing asbestos in products such as gaskets and valve packings.

UCAR's third major product line consists of ceramic products such as Boron Nitride, Pyrolytic Boron Nitride, and Pyrolytic Graphite. Boron Nitride is made from raw material powders. The resulting mixture is put through heating and hot pressure processes resulting in a solid plug. The plug is then machined into various products typically used in the vacuum metalizing industry.

Pyrolytic Boron Nitride and Graphite are made by a gas deposition process to produce crucibles and other shapes which are primarily used in the electronics industry.

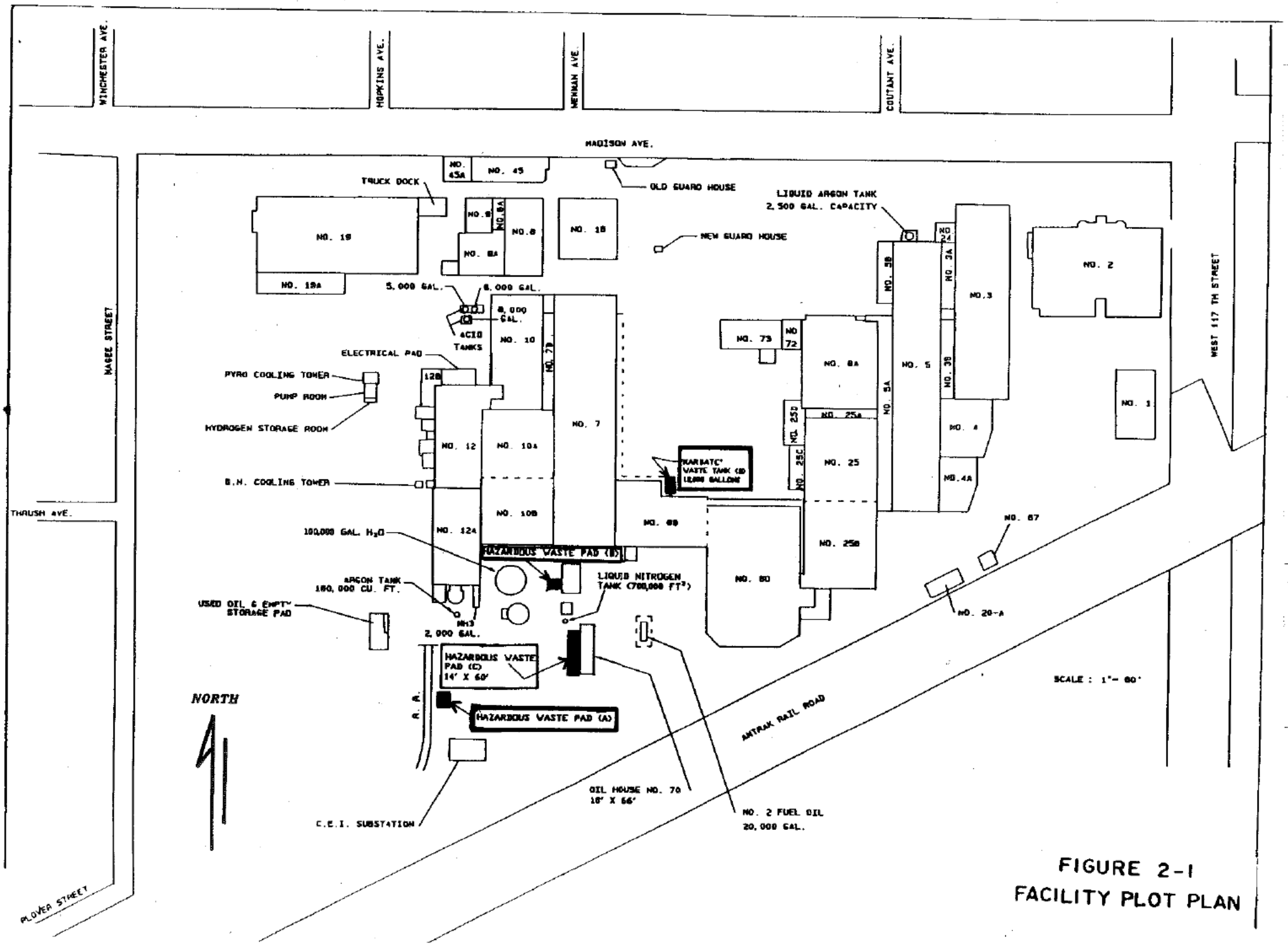


FIGURE 2-1
FACILITY PLOT PLAN

## 2.3 Hazardous Waste Management Facilities

Within the UCAR plant, there are four hazardous waste management facilities (HWMFs) which include three container storage areas (Pads A, B, and C) and one storage tank (Tank D). Descriptive information for each of these HWMFs is listed on Table 2-1. The location of each HWMF is shown on Figure 2-1.

TABLE 2-1
HAZARDOUS WASTE MANAGEMENT FACILITIES INFORMATION

| HWMF | DIMENSIONS | CONSTRUCTION MATERIAL | SECONDARY CONTAINMENT | SUMP DIMENSIONS | TYPE OF FENCING |
|---|---|---|---|---|---|
| Pad A | 16 ft. wide x 20 ft. long x 0.5 ft. thick | Reinforced concrete | 4-inch concrete curbing | 18 inch diameter x 23 inches deep | 7 ft. high steel wire |
| Pad B | 13.5 ft. wide x 17.5 ft. long x 0.5 ft. thick | Reinforced concrete | 4-inch concrete curbing | 15 inch diameter x 19 inches deep | 6 ft. high stee wire |
| Pad C | 14 ft. wide x 60 ft. long | Concrete | None | No sump | No fencing |
| Tank D | 10 ft. diameter x 20.5 ft. length | Mild steel (welded and riveted) | 1 ft - 10 inch high concrete dike | No sump | No fencing |

## 3.0 DESCRIPTION OF HAZARDOUS WASTE MANAGEMENT FACILITY TO BE CLOSED

Pad C is a container storage area previously used to store hazardous waste material in 55-gallon drums. It is located on the west side of the oil storage building (refer to Figure 2-1). The container storage area occupies approximately 840 square feet measuring 14 feet in width and 60 feet in length. It is a concrete pad with no curbing, containment, or fencing.

Use of Pad C was discontinued in 1982. The pad had been previously used for the storage of wastes generated from several areas within the plant including GRAFOIL® production and fabrication, ceramics production, degreasing operations, Karbate production and cleaning and maintenance operations within the paint area. Specifically, facility records indicate that the following types of wastes had been stored on the pad:

- Waste Acetone Mixture (F003);
- Waste Toluene Mixture (F003);
- Waste Methanol Mixture (F005);
- Waste Methyl Ethyl Ketone Mixture (F005); and
- Waste Stoddard Solvent (D001).

# 4.0 MAXIMUM WASTE INVENTORY

Based upon UCAR's manifest records, the use of Pad C for the storage of hazardous waste was discontinued in 1982. There is no waste inventory presently stored on the pad nor expected to be stored on the pad at the time of closure. Therefore, removal activities will not be necessary.

# 5.0 CLOSURE PERFORMANCE STANDARD

UCAR is proposing to clean close Pad C. The method by which UCAR intends to demonstrate clean closure is through chemical analysis of decontaminating rinsate. The analysis that was selected was derived from the types of wastes which were stored on the pad. The quantitative criteria that were selected to demonstrate the absence of contamination resulted from a telephone conversation conducted on 13 February 1989 with EPA, OEPA, UCAR and ENSR representatives. The closure performance standard is discussed in greater detail below.

## 5.1 Sample Collection

UCAR will initiate closure of Pad C by decontaminating the pad via steam cleaning. The rinsate will be collected and stored in drums. Samples will be withdrawn from the drums as described in the Sampling Work Plan presented as Appendix I.

## 5.2 Analysis of Decontaminating Rinsate

As previously mentioned, the analytical constituents that have been selected for analysis of the decontaminating rinsate are directly correlated to the types of wastes which were stored at the facility. UCAR has conducted a historical review of operating logs and shipping records that have been maintained since 1980. These documents have been maintained per interim status requirements. The results of this review, and analytical constituent detection methods are presented in Table 5-1.

## 5.3 Closure Criteria

The quantitative criteria that have been selected are a function of discussions with the OEPA and EPA. UCAR initially approached the closure of this unit by proposing to conduct representative and random predecontamination sampling for TCLP

TABLE 5-1

WASTE DESCRIPTION AND CONSTITUENT DETECTION METHODS
USED FOR CLOSURE OF PAD C

| Waste Description | EPA ID Number | Constituent of Concern | Analytical Method | Method Number |
|---|---|---|---|---|
| Waste Acetone Mixture | F003 | Acetone | GC/MS for Volatile Organics | 8240 |
| Waste Toluene Mixture | F005 | Toluene | GC/MS for Volatile Organics | 8240 |
| Waste Methyl Ethyl Keytone Mixture | F005 | Methylethyl Keytone | GC/MS for Volatile Organics | 8240 |
| Waste Methanol Mixture | F005 | Methanol | GC Nonhalogenated Volatile Organics | 8015 |
| Waste Stoddard Solvent | D001 | Ignitability | Pensley-Martin Closed Cup | 1010 |

constituents and criteria. Based on the results of this sampling and analysis, UCAR could determine the existence of contamination at the pad. This proposal was rejected by the EPA, who suggested analysis of decontaminating rinsate, suggesting that, regardless of the predecontamination sampling results, decontamination would probably be required with analysis of the rinsate.

Therefore, UCAR has revised the closure performance standard to agree with EPA's suggestion. The criteria that were suggested were level of detection for listed organic constituents and standard criteria for RCRA characteristics. These criteria have been summarized in Table 5-2 for each type of waste previously stored at the facility. The methods by which these constituents will be analyzed have been presented in Section 5.2. Because level of detection is a function of analytical procedure and sample matrix, the criteria for listed organic constituents are not quantified, but simply noted as the limit of detection. In addition, laboratory quality control and quality assurance documents cannot be included in this plan as they are laboratory specific.

TABLE 5-2
QUANTITATIVE CRITERIA FOR CLEAN CLOSURE
OF UCAR'S PAD C

| Waste Description | EPA ID Number | Constituent of Concern | Quantitative Level |
|---|---|---|---|
| Waste Acetone Mixture | F003 | Acetone | Level of Detection |
| Waste Toluene Mixture | F005 | Toluene | Level of Detection |
| Waste Methyl Ethyl Keytone Mixture | F005 | Methyl Ethyl Keytone | Level of Detection |
| Waste Methanol Mixture | F005 | Methanol | Level of Detection |
| Waste Stoddard Solvent | D001 | Ignitability | <140°F* |

*The determination of contamination will be below these criteria for constituents

# 6.0 CLOSURE ACTIVITIES

Closure of Pad C will consist of five major work activities. These include: 1) decontamination of the containment structure; 2) confirmation sampling; 3) contingent second round of decontamination; 4) management of auxiliary equipment; and 5) closure certification. A brief description of the entire closure process follows.

Closure activities will initiate with general cleaning of the pad via broom cleaning followed by construction of a concrete curb surrounding the pad area. The curbing will be used temporarily during decontamination in order to contain the generated rinsate. The concrete pad will then be decontaminated using a steam cleaner. The generated wastewaters or rinsate will be collected from the containment area and pumped into clean 55-gallon drums (a more detailed description of decontamination activities are presented in Section 7.0).

Following decontamination activities, 20 percent of the drums of rinsate will be sampled via disposable sampling thiefs. The drum samples will be composited into one representative rinsate sample. This composite sample will be shipped to an EPA-approved laboratory for analysis of volatile organics as specified in Section 5.0 and RCRA characteristics for ignitability. The drums of rinsate will be staged within container storage area Pad A and Pad B until the analytical results are received from the laboratory. If the analytical results are above the criteria listed in Section 5.3, the drummed rinsate will be disposed off site at an approved treatment, storage, or disposal facility (TSDF) and a second round of decontamination, including steam cleaning, sampling and analysis will be performed on the containment area of Pad C. The criteria, listed in Section 5.3, will again be used to determine if the second round of steam cleaning is sufficient. If the rinsate is again above the listed criteria, UCAR will implement another method of decontamination.

If the analytical results from the rinsate are below the listed criteria (Section 5.3), the pad will be considered "clean" and the resulting rinsate will be discharged to the local POTW with appropriate permission.

Following confirmation of closure, the auxiliary equipment used throughout decontamination and sampling activities will be either disposed of appropriately or, if necessary, decontaminated via steam cleaning (a more detailed description of the management of the auxiliary equipment is presented in Section 8.0).

Following decontamination confirmation, the temporary curbing will be removed and disposed off site as general construction debris. The concrete pad will remain intact. UCAR does not intend to use Pad C as a hazardous waste container storage area after closure has been certified via an independent professional engineer. The pad area is intended to be used as a traffic area.

There is no partial closure anticipated for Pad C. The pad will be closed clean based upon the closure criteria presented in Section 5.0, therefore no post closure plan has been included. It is anticipated that Pad C will close during 1989.

# 7.0 DECONTAMINATION

Prior to the commencement of steam cleaning activities, the pad area will be swept cleaned and then a temporary concrete curbing structure will be constructed around Pad C. This curbing structure will serve the purpose of a containment structure during decontamination activities which will include steam cleaning of the concrete pad area. Wastewaters or rinsate generated during steam cleaning will be collected within the curbed area using squeegees and a pump. The collected rinsate will then be pumped into cleaned 55-gallon drums.

Twenty percent of the drums will be sampled. These drum samples will be composited into one representative rinsate sample which will be analyzed for volatile organics as specified in Section 5.0 and RCRA characteristics for ignitability to confirm decontamination. Following sampling activities, the drums containing the rinsate will be stored on Pads A and/or B until the analytical results have been received.

Depending upon the results, the drums will either be shipped off site as hazardous waste to an approved TSDF or the drum contents will be discharged to the local POTW. Appropriate approvals will be obtained prior to the use of either option. Precautions will be taken during decontamination procedures to ensure that all of the rinsate is collected. Decontamination of the area will be confirmed if the closure criteria specified in Section 5.3 are met. If necessary, a second round of decontamination including steam cleaning, sampling and analysis will be repeated in order to meet the closure criteria.

Personnel will follow the requirements of the Health and Safety Plan included in Appendix I which ensures that the appropriate personal protective equipment will be worn during all stages of closure.

Following decontamination verification, the temporary concrete curbing will be dismantled and disposed as construction debris. The concrete pad will remain intact.

No soil contamination is anticipated beneath the pad area. There are no visible signs of staining, cracks or spalling on the pad. Therefore, there is no reason to suspect contamination beneath the containment structure.

All work will be performed in strict accordance with applicable federal, state, and local health, fire and safety regulations. An estimate of time and costs for these closure activities is presented in Section 10.0.

# 8.0 MANAGEMENT OF AUXILIARY EQUIPMENT

The auxiliary equipment used during the closure activities will either be containerized in 55-gallon drums and transported off site for appropriate disposal or decontaminated via steam cleaning. Auxiliary equipment will include brooms, sampling thiefs, the sump pump and personal protective gear.

All work will be performed in strict accordance with applicable federal, state, and local health, fire, and safety regulations. An estimate of time and costs for this closure activity is presented in Section 10.0.

# 9.0 SCHEDULE FOR CLOSURE

As stated earlier, the container storage area, Pad C, is expected to close during 1989. With the submission of this plan, UCAR is notifying the State Commissioner and/or Ohio EPA Regional Administrator in writing at least 180 days prior to the expected date of final closure. Table 9-1 presents a milestone schedule to be followed as a guideline for closure activities.

TABLE 9-1

MILESTONES FOR CLOSURE OF CONTAINER STORAGE AREA
PAD C

| | Closure Activity | Maximum Time from Initiation of Final Closure to Completion of Closure Activity |
|---|---|---|
| 1. | EPA approval | 1 day |
| 2. | Removal of waste inventory | N/A* |
| 3. | Construction of temporary containment | 90 days |
| 4. | Decontamination of concrete pad | 100 days |
| 5. | Confirmation sampling of containment area | 110 days |
| 6. | Receipt analytical results | 160 days |
| 7. | Auxiliary equipment disposal or decontamination | 170 days |
| 8. | Completion of closure | 180 days |
| 9. | Certification of closure completion by a registered professional engineer | 240 days |

*This activity is not applicable to closure because use of Pad C was discontinued in 1982 and no waste inventory is present.

# 10.0 CLOSURE COST ESTIMATE

Closure of Pad C will involve five major activities which include: 1) decontamination of the containment area, 2) confirmation sampling, 3) contingent second round decontamination, 4) management of auxiliary equipment, and 5) professional certification. This section of the closure plan identifies the assumptions made to develop the costs associated with the above-mentioned closure activities.

As required by 40CFR 265.142, the cost estimate has been based upon the point in the facility's active life which would make closure costs the most expensive. In addition, the costs have been based upon third party costs.

The cost estimate is based upon the waste inventory and other hazardous wastes generated during decontamination activities being disposed as hazardous waste at an approved off-site facility. Hazardous waste transportation/disposal costs are based on past costs for these wastes. Costs for labor and equipment for the other closure activities were derived from the MEANS Site Work Cost Data, 1989 edition and from the Final Report Guidance Manual: Cost Estimates for Closure and Post-Closure Plans, (Subparts G and H), Volume I, II, III, and IV, November 1986, U.S. Department of Commerce, NTIS. Analytical service costs were derived from the 1989 ENSR Analytical Laboratories Price Schedule. All costs are based on 1989 dollars. Other miscellaneous assumptions were based on best engineering judgment.

Table 10-1 presents a worksheet which itemizes the individual work items involved in implementing each major closure activity. Refer to this table throughout the description of each closure activity for a breakdown of individual costs for each work item.

The assumptions associated with each of the five major closure activities are described in the sections that follow.

TABLE 10-1: CLOSURE COST ESTIMATE FOR CONTAINER STORAGE AREA PAD C

| | QUANTITY | UNIT COST | UNITS | TOTAL COSTS | SUBTOTALS | COMMENTS |
|---|---|---|---|---|---|---|
| 10.1 REMOVAL OF MAXIMUM WASTE INVENTORY | | | | | | |
| NO WASTE INVENTORY TO BE STAGED ON THE PAD AT TIME OF CLOSURE | | | | | | |
| SUBTOTAL | | | | | $0.00 | |
| 10.2 DECONTAMINATION OF CONTAINMENT AREA | | | | | | |
| GENERAL CLEANING OF PAD:BUILDING LABORER | 4 | $25.40 | HR | $101.60 | | LABOR COST FOR BROOM SWEEPING |
| CONSTRUCTION OF CURBING | | | | | | BASED UPON AN 8 INCH X 6 INCH HIGH CURB |
| EQUIPMENT: BERM MACHINE | 1 | $39.15 | DAY | $39.15 | | RENTAL CHARGE |
| LABOR: BUILDING LABORERS | 24 | $25.40 | HR | $609.60 | | 3 BUILDING LABORERS FOR 8 HOURS EACH |
| CONCRETE MATERIAL | 2 | $52.30 | CY | $104.60 | | READY-MIX TYPE |
| STEAM CLEANING: CLEAN APPROX. 50 SF PER HOUR | | | | | | |
| EQUIPMENT: | | | | | | |
| STEAM CLEANER, 200 GPH | 3 | $43.00 | DAY | $129.00 | | RENTAL FOR 3 DAYS; 17 HOURS FOR 840 SF AREA |
| OPERATING COSTS | 17 | $0.57 | HR | $9.69 | | |
| LABOR: | | | | | | |
| BUILDING LABORER | 17 | $25.40 | HR | $431.80 | | LABOR COST |
| MANAGEMENT OF DECONTAMINATION WASHWATERS- DRUM THE RINSATE | | | | | | |
| LABOR: | | | | | | |
| BUILDING LABORER | 17 | $25.40 | HR | $431.80 | | LABOR COST |
| PURCHASE DRUMS | 62 | $50.00 | DRUM | $3,100.00 | | COST OF NEW DRUMS--VENDOR QUOTE |
| REPLACE DRUMS BACK ONTO PAD | | | | | | NUMBER OF GENERATED RINSATE DRUMS: 62 |
| LABOR: | | | | | | |
| BUILDING LABORER | 3 | $25.40 | HR | $76.20 | | LABOR COST |
| LIGHT EQUP OPERATOR | 3 | $30.60 | HR | $91.80 | | LABOR COST FOR A FORKLIFT DRIVER |
| EQUIPMENT: FORK LIFT | 3 | $20.60 | HR | $61.80 | | ASSUME UCAR OWNS THE FORKLIFT; OPERATION CHARGE |
| PROTECTIVE CLOTHING/EQUIPMENT FOR ALL DECONTAMINATION ACTIVITIES | 2 | $85.00 | PERSON | $170.00 | | INCL. SPLASH SUIT, SHOE COVERS, APRON, GLOVES, GOGGLES, HALF-MASK RESPIRATOR, AND HARD HAT. |
| SUBTOTAL | | | | | $5,357.04 | |
| 10.3 CONFIRMATION SAMPLING | | | | | | |
| SAMPLING EQUIPMENT | 13 | $20.00 | EACH | $260.00 | | DISPOSABLE SAMPLERS |
| LABOR: | | | | | | |
| LAB TECHNICIAN | 13 | $25.00 | HR | $325.00 | | 1 HR/SAMPLE REQUIRED TO COLLECT,PRESERVE AND LOG. |
| SHIPMENT OF SAMPLE | 1 | $50.00 | SHIPMT | $50.00 | | INC. SHIPPING COSTS AND SUPPLIES(ie. COOLER, ICE) |
| LAB ANALYSIS: | | | | | | |
| VOLATILES | 1 | $230.00 | SAMPLE | $230.00 | | |
| IGNITABILITY | 1 | $35.00 | SAMPLE | $35.00 | | |
| SUBTOTAL | | | | | $900.00 | |

TABLE 10-1: CLOSURE COST ESTIMATE FOR CONTAINER STORAGE AREA PAD C

| | QUANTITY | UNIT COST | UNITS | TOTAL COSTS | SUBTOTALS | COMMENTS |
|---|---|---|---|---|---|---|
| 10.4 CONTINGENT SECOND ROUND DECONTAMINATION | | | | | | |
| MANAGEMENT OF CONTAMINATED RINSATE | | | | | | |
| TRANSPORTATION | 250 | $3.60 | LD-MILE | $900.00 | | 80 DRUMS/TRUCKLOAD;250 MILES DISTANCE TO FACILITY |
| OFF-SITE TREATMENT | 3410 | $0.50 | GAL | $1,705.00 | | TYPICAL COMMERCIAL HAZARDOUS WASTE TREATMENT COST |
| STEAM CLEANING: CLEAN APPROX. 50 SF PER HOUR | | | | | | |
| EQUIPMENT: | | | | | | |
| STEAM CLEANER, 200 GPH | 3 | $43.00 | DAY | $129.00 | | RENTAL FOR 3 DAYS; 17 HOURS FOR 840 SF AREA |
| OPERATING COSTS | 17 | $0.57 | HR | $9.69 | | |
| LABOR: | | | | | | |
| BUILDING LABORER | 17 | $25.40 | HR | $431.80 | | LABOR COST |
| MANAGEMENT OF DECONTAMINATION WASHWATERS- DRUM THE RINSATE | | | | | | |
| LABOR: BUILDING LABORER | 17 | $25.40 | HR | $431.80 | | LABOR COST |
| PURCHASE DRUMS | 62 | $50.00 | DRUM | $3,100.00 | | COST OF NEW DRUMS--VENDOR QUOTE |
| REPLACE DRUMS BACK ONTO PAD | | | | | | NUMBER OF GENERATED RINSATE DRUMS: 62 |
| LABOR: | | | | | | |
| BUILDING LABORER | 3 | $25.40 | HR | $76.20 | | LABOR COST |
| LIGHT EQUP OPERATOR | 3 | $30.60 | HR | $91.80 | | LABOR COST FOR A FORKLIFT DRIVER |
| EQUIPMENT: | | | | | | |
| FORK LIFT | 3 | $20.60 | HR | $61.80 | | ASSUME UCAR OWNS THE FORKLIFT; OPERATION CHARGE |
| PROTECTIVE CLOTHING/EQUIPMENT FOR ALL DECONTAMINATION ACTIVITIES | 2 | $85.00 | PERSON | $170.00 | | INCL. SPLASH SUIT, SHOE COVERS, APRON, GLOVES, GOGGLES, HALF-MASK RESPIRATOR, AND HARD HAT. |
| SAMPLING AND ANALYSIS: | | | | | | |
| SAMPLING EQUIPMENT | 13 | $20.00 | EACH | $260.00 | | DISPOSABLE SAMPLERS |
| LABOR: LAB TECHNICIAN | 13 | $25.00 | HR | $325.00 | | 1 HR/SAMPLE REQUIRED TO COLLECT,PRESERVE AND LOG. |
| SHIPMENT OF SAMPLE | 1 | $50.00 | SHIPMT | $50.00 | | INC. SHIPPING COSTS AND SUPPLIES(ie. COOLER, ICE) |
| LAB ANALYSIS: | | | | | | |
| VOLATILES | 1 | $230.00 | SAMPLE | $230.00 | | |
| IGNITABILITY | 1 | $35.00 | SAMPLE | $35.00 | | |
| MANAGEMENT OF SECOND ROUND RINSATE: | | | | | | |
| DISCHARGE TO POTW | 3410 | $0.00 | GAL | $0.00 | | ASSUME POTW COST IS NEGLIGIBLE |
| SUBTOTAL | | | | | $8,007.09 | |

TABLE 10-1: CLOSURE COST ESTIMATE FOR CONTAINER STORAGE AREA PAD C

| | QUANTITY | UNIT COST | UNITS | TOTAL COSTS | SUBTOTALS | COMMENTS |
|---|---|---|---|---|---|---|
| 10.5 MANAGEMENT OF AUXILIARY EQUIPMENT | | | | | | |
| DISPOSABLE GEAR | | | | | | |
| LABOR: BUILDING LABORER | 4 | $25.40 | HR | $101.60 | | ONE LABORER REQUIRED FOR 4 HOURS |
| TRANSPORT | 250 | $3.60 | LD-MILE | $900.00 | | |
| INCINERATION | 0.1 | $1,000.00 | TON | $100.00 | | ASSUME 200 POUNDS OF SOLID WASTE GENERATED- INCLUDING DRUMS |
| SUBTOTAL | | | | | $1,101.60 | |
| 10.6 PROFESSIONAL CERTIFICATION | | | | | | |
| PERIODICAL INSPECTION AND DOCUMENTATION | 36 | $50.00 | HR | $1,800.00 | | REGISTERED INDEP PROFESS ENGINEER, INC 3 INSPECTS W/REPORTS, REVIEW PLAN, AND FINAL DOCUMENTATION |
| ADMINISTRATIVE - CLERICAL LABOR | 12 | $19.00 | HR | $228.00 | | 4 HOURS/WEEK FOR 3 WEEKS |
| SUBTOTAL | | | | | $2,028.00 | |
| TOTAL DIRECT CAPITAL COSTS | | | | | $17,393.73 | |
| INDIRECT COSTS | | | | | | |
| ADMINISTRATIVE AND SUPERVISORY (15% OF DIRECT CAPITAL COSTS) | | | | | $2,609.06 | |
| CONTINGENCY FEE (10% OF DCC) | | | | | $1,739.37 | |
| TOTAL | | | | | $21,742.16 | |
| (ucc-padc) | | | | | | |

## 10.1 Removal of Maximum Waste Inventory

Pad C has not been used for hazardous waste storage since 1982, and it is not expected to be used in the future. There is no waste inventory staged on the pad area, therefore the removal costs are estimated to be $0.

## 10.2 Decontamination of the Containment Area

One building laborer will be required for four hours to clean the pad area with a broom. Any debris will be drummed. Approximately 148 linear feet of six inch high, 8 inch wide concrete curbing will be constructed around Pad C to create a curb for decontamination purposes. The length was determined from the perimeter dimensions of Pad C (14 feet by 60 feet). Construction of the curbing will require three laborers and a berm machine for 8 hours. Approximately 2.0 cubic yards (50 cubic feet) of ready-mix concrete will be needed.

Decontamination of the containment area of Pad C will require a one-man crew for 17 hours to steam clean the concrete containment area. It was estimated that the pad area will have approximately 840 square feet requiring steam cleaning. This value was based on the dimensions of the pad area, 14 feet by 60 feet. Approximately 50 square feet of area can be steam cleaned per hour. A 200-gallon per hours steam cleaner will be rented for three days and operated for 17 hours.

The rinsate will be collected from within the curbed area and pumped to 55-gallon drums. New drums will be purchased. Approximately 62 drums of rinsate will be generated. A laborer will be required for 17 hours to manage the generated rinsate.

Protective clothing will be required for a two man crew. This may include a splash suit, shoe covers, an apron, gloves, goggles, a half-mask respirator, and a hard hat for each man.

Following sampling, the drums of rinsate will be placed within container storage areas Pads A and B while awaiting the analytical results. A two-man crew with a forklift will be

required for three hours each to move the drums onto the pads.

As shown on Table 10-1, the total estimated cost for decontaminating the containment area is approximately $5,400.

## 10.3 Confirmation Sampling

As stated in the Sampling Work Plan (Appendix I), 20 percent of the generated drums of rinsate will be sampled to confirm decontamination of the containment area. Therefore, 13 drums will be sampled for Pad C (the calculation is presented in Appendix I). Thirteen disposable samplers will be purchased. A field technician will be required for 13 hours to collect, preserve, and log the samples. The drum samples will then be composited into one representative rinsate sample. The composite sample will be sent for analysis of volatiles described in Section 5.0 and ignitability. A shipping charge of $50 per shipment has been included. The total cost for confirmation sampling and analysis is approximately $900.

## 10.4 Contingent Second Round Decontamination

In the unlikely event that a second round of decontamination is required based on the analytical results for the rinsate, the 62 drums of rinsate will be transported to an approved TSDF. For purposes of this cost estimate, the costs have been based upon typical costs for treatment at an approved hazardous waste treatment facility located approximately 250 miles away. Typical transportation and treatment costs are $3.60 per loaded mile, and $0.50 per gallon, respectively.

The remaining activities under this second round of decontamination will replicate those presented in Section 10.2 (steam cleaning and management of the rinsate) and Section 10.3 (sampling and analysis of the rinsate).

For this cost estimate, it is assumed that the analytical results of the second round of rinsate are below the closure criteria and the rinsate can be discharged to the local POTW with

negligible costs incurred. Therefore, the total cost for the contingent second round of decontamination is approximately $8,000.

## 10.5 Management of Auxiliary Equipment

An estimated two containers (55 gallon drum) of disposable gear (e.g., brooms, sampling thiefs, splash suit, gloves) weighing approximately 200 pounds will be collected during the course of facility closure. This drum will be disposed as solid hazardous waste at an approved off-site TSDF. For costing purposes only, an off-site incinerator has been assumed. A laborer will be required for 4 hours to manage the waste. Transportation costs are based upon the 250 mile trip at a cost of $3.60 per loaded mile. Incineration costs are estimated at $1,000 per ton. The total cost for this closure activity is estimated to be $1,100.

## 10.6 Professional Certification

Assume that 36 hours will be required for a registered independent professional engineer to oversee closure and certify that the facility has been closed in accordance with the closure plan. This includes time to review the closure plan, time for three site inspections with draft reports, and time for final documentation.

Assume that 12 hours will be required from the owner's or operator's staff for administrative duties and clerical work. Therefore, the total cost of professional certification is estimated to be $2,000.

## 10.7 Total Costs Including Indirect Costs

A summary of the estimated closure costs for the container storage area, Pad C, is presented on Table 10-2. The total direct capital costs for the closure activities is estimated to

TABLE 10-2: SUMMARY OF CLOSURE COSTS FOR PAD C

| | CLOSURE ACTIVITY | COST |
|---|---|---|
| 10.1 | REMOVAL OF MAXIMUM WASTE INVENTORY | $0.00 |
| 10.2 | DECONTAMINATION OF CONTAINMENT AREA | $5,357.04 |
| 10.3 | CONFIRMATION SAMPLING | $900.00 |
| 10.4 | CONTINGENT SECOND ROUND DECONTAMINATION | $8,007.09 |
| 10.5 | MANAGEMENT OF AUXILIARY EQUIPMENT | $1,101.60 |
| 10.6 | PROFESSIONAL CERTIFICATION | $2,028.00 |
| | TOTAL DIRECT CAPITAL COSTS | $17,393.73 |
| | INDIRECT COSTS: | |
| | ADMINISTRATIVE AND SUPERVISORY (15% OF DCC) | $2,609.06 |
| | CONTINGENCY FEE (10% OF DCC) | $1,739.37 |
| | TOTAL COSTS | $21,742.16 |

(ucc-padc)

be approximately $17,400. A general provision for contingencies of 10 percent of the direct capital costs has been added. For administrative tasks including taxes, insurance, and supervision not listed elsewhere, an additional cost equal to 15 percent of the total direct capital cost has also been added. Therefore, the total cost for closing Pad C is approximately $22,000.

# 11.0 FINANCIAL ASSURANCE

The financial test and corporate guarantee for closure have been met pursuant to 40 CFR 265.143. UCAR's financial mechanism is included on the pages that follow.

UNION CARBIDE CORPORATION 39 OLD RIDGEBURY ROAD, DANBURY, CT 06817-0001

CAROLYN A. O'BOYLE
MANAGER
BANKING DEPARTMENT

October 17, 1988

Ms. J. Kwasniewski
RCRA Enforcement Section
Division of Solid and
Hazardous Waste Management
Ohio Environmental Protection Agency
P. O. Box 1049
1800 Water Mark Drive
Columbus, OH 43266-0149

Dear Ms. Kwasniewski:

Subject: Financial Assurance
Closure and Post-Closure
Hazardous Waste Management Facility

Attached is the revised Schedule A for the Trust Agreement dated as of April 30, 1987, between Union Carbide Corporation, the Grantor, and Chemical Bank, the Trustee. The closure costs for the Lakewood Plant on Scheduled A have been increased to $70,000 from $68,000. Schedule B was revised to reflect an increase of $1,000, which reflects the change for Lakewood.

Also, the EPA ID number for the Parma Facility was corrected to OHD 003926748.

Very truly yours,

Carolyn A. O'Boyle

CAO'B:kbc

Attachment

Copy to: Mr. G. McFarland, Chemical Bank, NY

Blind Copy to: D. Mieskowski
J. Petros
H. T. Prossa

0066B:88

## SCHEDULE A *

| | |
|---|---|
| Union Carbide Corporation - Lakewood Plant | |
| EPA ID No. OHO 004167383 | |
| Lakewood, OH | |
| Closure Costs | $ 70,000 (R) |
| Post-Closure Costs | - 0 - |

| | |
|---|---|
| Union Carbide Corporation - Parma Facility | |
| EPA ID NO. OHD 003926748 | |
| Parma, OH | |
| Closure Costs | $ 119,000 |
| Post-Closure Costs | - 0 - |

| | |
|---|---|
| L-Tec Company - Ashtabula Plant | |
| EPA ID NO. OHO 000821454 | |
| Ashtabula, OH | |
| Closure Costs | $1,463,000 |
| Post-Closure Costs | $ 553,000 |

* Revised as of 09/21/88

0066B:12//

SCHEDULE B *

Union Carbide Corporation - Lakewood and Parma, OH
L-Tec Company - Ashtabula, OH

The Trust Fund is comprised of cash in the sum of $2,083,000

* Revised as of 09/21/88

0066B:13

# 12.0 CLOSURE CERTIFICATION

UCAR will submit to the Ohio EPA Director and the EPA Administrator certification by UCAR and an independent registered professional engineer that the container storage area Pad C has been closed in accordance with the specifications of the approved closure plan. The independent professional engineer will inspect the facility during the closure period and after all the decontamination procedures have been completed. Closure certification will be submitted within 60 days of completion of closure activities.

APPENDIX

# APPENDIX I
# SAMPLING WORK PLAN

# 1.0 INTRODUCTION

The following secondary containment area Sampling Work Plan was prepared for Union Carbide Corporation's UCAR Carbon Company in Lakewood, Ohio. The plan will be used to determine the existence of contamination at the containment structure. The results of the sampling and subsequent analysis will be used to close the hazardous waste management facility (HWMF).

This document is organized as follows: Section 2.0 Sampling Plan which delineates sampling methodology and protocol for the containment area; and Section 3.0 the Health and Safety Plan for decontamination and sampling.

# 2.0 SAMPLING PLAN

## 2.1 Approach

Union Carbide Corporation's UCAR Carbon Company (UCAR) has elected to demonstrate clean closure by conducting decontamination rinsate sampling of the concrete pad. The method by which clean closure will be demonstrated is based on the analytical results of representative sampling of drums of collected decontamination rinsate.

The selection of the analytical constituents is based on the types of hazardous wastes stored in the area. It is UCAR's opinion that analyzing for these constituents will identify the current status of contamination at the pad (i.e. contaminated or not contaminated).

The remainder of this document provides the methodology and procedures that will be used to close the HWMF.

## 2.2 Sampling Methodology

During the decontamination process of the Pad C concrete area, the rinsate from the process will be collected and drummed. The rinsate will be contained and collected from within the temporarily curbed area. A portable pump will be used to deliver collected rinsate from the pad to the drums.

To ensure that a representative sample is acquired for analysis, UCAR will withdraw samples with disposable stratified sample thiefs from 20 percent of the rinsate drums that are filled. UCAR has calculated the estimated number of drums that may be generated using documented decontamination rinsate generation rates.

The dimensions of Pad C are 14 feet by 60 feet. Therefore, the total area of the base of the Pad C concrete structure is 840 square feet. The estimated area that can be decontaminated

in an hour is 50 square feet.[1] The most common steam cleaner uses approximately 200 gallons per hour.[2] Therefore, using the equation:

number of drums = pad area x rinsate generation rate/decontamination rate/55 gallons per drum

= 840 $ft^2$ X 200 gal/hr/50$ft^2$/hr

= 3360 gal.

= 62 55-gallon drums

Thus, the total estimated number of drums that will be sampled is 13. Once all the drums have been filled, 13 of the drums will be arbitrarily selected. This will impart randomness to the sampling protocol.

UCAR will composite the decontamination rinsate into one sample. Each drum that is selected will be sampled to the bottom of the drum with a disposable stratified sampling thief. A sampling thief will be used for each drum sampled.

Drums will be placed on pallets prior to filling with decontamination rinsate. Following decontamination of the pad, the drums will be stored on container storage areas Pad A and Pad B until the analytical results have been received. If the results indicate contamination by failing the criteria listed in Section 5.0, the drums will be shipped off site as hazardous. If the drums do not indicate contamination, the drums will be discharged to the local POTW per granted permission.

## 2.3 Sample Containers

The use of sample containers is a function of the type of analyses that will be conducted on the samples. UCAR will be conducting analyses for volatile organics and RCRA characteristics for ignitability as described in greater detail in the

---

[1] Guidance Manual: Cost Estimates for Closure and Post Closure Plans (Subparts G and H), EPA/530-SW-87-009A, Pg. 5-3.

[2] Means Site Work Cost Data; RS Means Company Inc. 1989, Pg. 14.

Therefore, two types of containers will be used for sample collection and shipment.

The containers that will be used by sampling personnel will be purchased from an outside facility which sells new or precleaned amber bottles, or new or precleaned containers will be supplied by the sampling vendor. At a minimum, the containers will have undergone a triple rinse with methanol and deionized water. The container caps will have Teflon liners. The types of containers, along with preservatives and holding times for the required analyses are presented in Table 2-1.

## 2.4 Sample Collection

The equipment to be utilized for the sampling of decontaminating rinse drums will concur to guidelines illustrated in EPA document SW 846. The liquid sampling device to be employed will be a stratified sampling thief. This device will be disposable and only used once, thus eliminating the need to decontaminate the sampler.

Special attention will be given to the sampling for volatile organics. These sample containers will be filled in such a manner as to preclude any air pockets or bubbles (zero head space). All other containers will be filled to capacity.

All samples collected including the quality control samples will be refrigerated in a cooler packed with ice or its equivalent and sent to an approved laboratory within 24 hours.

Decontaminating and sampling personnel will wear the necessary personnel protective equipment as prescribed by Section 3.0 of this Work Plan.

TABLE 2-1
SAMPLING CONTAINERS, PRESERVATIVES, AND
HOLDING TIMES FOR UCAR'S CLEAN CLOSURE ANALYSIS

| Analyte | Container | Preservative | Holding Time |
|---|---|---|---|
| Volatile organics | (2) 40ml amber glass with Teflon lined cap | Cool, 4°C, 4 drops of concentrated HCl | 14 days |
| RCRA characteristics except | 1 gal. amber glass with Teflon lined cap | Cool, 4°C | 7 days |

## 2.5 Sample Identification and Shipping

The sampling team will assign a discrete number to the collected sample such that it identifies the sample. As the samples are collected, the sampling team will record the information outlined on the waste sample log sheet depicted in Figure 2-1. Concurrently, the sampling team will utilize chain-of-custody records as shown in Figure 2-2. The minimum information recorded on the chain-of-custody in addition to the signatures and dates of all custodians will include:

- o Sampling site identification,
- o Sampling date and time,
- o Identification of sample collector,
- o Sample identification, and
- o Sample description (type and quantity).

Each sample bottle will be packed in a cooler and shipped to an EPA/OEPA approved laboratory for analysis. Each cooler will be sealed with a chain-of-custody tape and the seals will be signed and dated. The chain-of-custody seal numbers will be entered on the chain-of-custody form (in the signature box). The current custodian will sign the chain-of-custody record as "Relinquished By", enter the date and time, tear off and file the back copy with the appropriate waste sampling log and place the remainder in the shipping container with the samples.

The samples will be received at the laboratory by the Laboratory Sample Custodian. He will sign the chain-of-custody record as "Received for Laboratory" and enter the date and time.

## 2.6 Quality Control Samples

In addition to the drum samples, quality control samples will be collected. These samples include field blanks, trip blanks, and duplicate drum samples.

FIGURE 2-1

WASTE SAMPLE LOG SHEET

Field Sample No.: _____

Stream No.: _____

Add'l. Stream Nos: _____

_____

Collector(s): _____

Date: _____ Time: _____

Process Source: _____

_____

_____

Waste Description: _____

_____

_____

Site Type (Lagoon, Tank, Drum, Pipe): _____

Sample Location: Bldg/Floor/Column: _____ Department: _____

Label Information: _____

_____

Sample Collection:

Equipment Used: _____

Sample Type (grab, composite, etc.): _____

_____

| Laboratory Destination | No. Sample Containers | Analyses Requested | Date Shipped |
|---|---|---|---|
| Pittsburgh | | | |
| Houston | | | |
| Concord | | | |
| Other | | | |

(See attached chain-of-custody records for more information)

Field Data:

Type of material (physical state): _____

Color: _____

Layers: _____

pH: _____

Other: _____

General Comment(s): _____

_____

_____

_____

FIGURE 2-2: CHAIN OF CUSTODY RECORD

| Client/Project Name | Project Location | ANALYSES |
|---|---|---|
| Project No. | Field Logbook No. | |
| Sampler: (*Signature*) | Chain of Custody Tape No. | |

| Sample No./ Identification | Date | Time | Lab Sample Number | Type of Sample | | | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
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| | | | | | |
|---|---|---|---|---|---|
| Relinquished by: (*Signature*) | Date | Time | Received by: (*Signature*) | Date | Time |
| Relinquished by: (*Signature*) | Date | Time | Received by: (*Signature*) | Date | Time |
| Relinquished by: (*Signature*) | Date | Time | Received for Laboratory: (*Signature*) | Date | Time |
| Sample Disposal Method: | Disposed of by: (*Signature*) | | | Date | Time |

SAMPLE COLLECTOR

Environmental Research and Technology, Inc.
696 Virginia Road
Concord, MA 01742
617-369-8910

ANALYTICAL LABORATORY

ERT

Nº 5309

One field blank and trip blank will accompany the drum samples for each type of analysis to be conducted. The blank samples will contain deionized water. A duplicate drum sample will be collected in exactly the same fashion as that described in Sections 2.2, 2.3, and 2.5. The bottles will be labelled as duplicates and they will be retained should confirmation analysis be required.

## 3.0 HEALTH AND SAFETY PLAN

The Health and Safety Plan which follows this text is an example of the type and level of personnel protective equipment needed to decontaminate the pad and to sample the decontaminating rinsate.

Because the actual decontamination and sampling project cannot be awarded until the closure plan is approved, a vendor cannot be selected to conduct the work. Since ENSR has not been selected as the vendor to conduct such activities, ENSR cannot guarantee that this Health and Safety Plan will be used or followed. It will be the responsibility of UCAR to ensure that the vendor selected for decontaminating and sampling activities provides an adequate health and safety plan or follows the plan provided. If ENSR is selected as the decontaminating and sampling vendor, the following Health and Safety Plan will be followed implicitly.

# HEALTH AND SAFETY PLAN

for the

UNION CARBIDE CORPORATION'S - UCAR CARBON CO.
(Name of Site/Facility)

Located in

Cleveland (Lakewood), Ohio
(City) (State)

Project Number: 6900-048

Document Number: 6900-048-600

Division Number: 73

Date: March 10, 1989

Prepared By: Robert Merrill

Date: March 10, 1989

Approved By: _____

Date: _____

Robert J. Merrill, CIH
(Health and Safety Manager)

Date: March 10, 1989

ENSR

Formerly ERT

ENSR Consulting
and Engineering
740 Pasquinelli Drive
Suite 124
Westmont, IL 60559
(312) 887-1700

# HEALTH AND SAFETY PLAN

for the

Union Carbide Corporation's - UCAR Carbon Co.
(Name of Site/Facility)

Located in

Cleveland (Lakewood), Ohio
(City) (State)

Project Number: 6900-048-600

Division Number: 73

Date: March 10, 1989

ISSUED TO:

_____ _____
(Representing) (Name and Title)

I have received a copy of the ENSR Health and Safety Plan for this project and I have read and understand its purpose and scope.

_____
Signature

_____
Date

ENSR

Formerly ERT

ENSR Consulting
and Engineering

740 Pasquinelli Drive
Suite 124
Westmont, IL 60559
(312) 887-1700

# PRE-JOB SAFETY MEETING

Date: _____

Attended by:

| Name | Signature |
| --- | --- |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

Topic(s) covered:

Conducted by:

_____

## SITE/PROJECT DESCRIPTION

SITE DESCRIPTION:

The plant is located in Cleveland (Lakewood), Ohio at West 117th Street. It began operations in 1894 at which time it produced arc carbons. Through the years, a variety of carbon products and other items have been produced such as graphite and carbon "brushes" for generators, wet and dry battery cells, vinylite karbate (impervious graphite), boron nitride, and "GRAFOIL" (flexible graphite).

SCOPE OF PROJECT/TASK:

Decontamination - secondary containment areas (i.e., concrete pads). These concrete pads served as container storage areas.
Decontamination will include steam cleaning. Sampling of the generated rinsate will also be performed.

PROPOSED DATE(S) OF FIELD ACTIVITIES:

90 days after approval of closure plans.

PERSONNEL REQUIREMENTS:

| NAME | RESPONSIBILITY |
|---|---|
| Mark Nardulli | ENSR Project Manager |
| (to be assigned) | ENSR Field Representative |
| (Contractor) | Decontamination Work |
| | |

## HAZARD EVALUATION

MATERIALS OF CONCERN:

Acetone, toluene, MEK, methanol, $Cr^{+6}$, 1,1,1-trichloroethane, stoddard solvent, and sulfuric acid residues.

PHYSICAL STATE:

Liquid - above materials may be found in dilute concentrations in rinsate.

The use of steam cleaning could result in a potential for vapor exposure to more volatile contaminants which may be present.

HEALTH HAZARD INFORMATION;

The following TLV's represent eight hour average airborne exposures to which most workers can be exposed without adverse health effects:

Acetone - 750 ppm
Methyl chloroform (1,1,1-trichloroethane) - 350 ppm
Methyl ethyl ketone (MEK) - 200 ppm
Methanol - 200 ppm
Stoddard solvent - 100 ppm
Toluene - 100 ppm
Sulfuric acid 1 $mg/m^3$

The solvent compounds listed above (acetone, methyl chloroform, MEK, methanol, etc.) are central nervous system depressants in very high airborne concentrations (above TLV levels). Since steam cleaning of concrete pads will occur outdoors, exposure to these solvents above TLV's is unlikely. Skin contact should definitely be avoided with these contaminants.
Methanol especially is a readily absorbed through the skin. Many of the above compounds are potent eye and skin irritants. Chromium in hexavalent (+6) form is highly toxic with some water insoluble compounds considered definite human carcinogens. The metal has also been linked to kidney damage in humans.

CHEMICAL/PHYSICAL PROPERTIES:

Chromium (+6) can occur in both water soluble and insoluble forms. Methanol, sulfuric acid, acetone and MEK are all water soluble or miscible in water. Stoddard solvent, toluene, and methyl chloroform are relatively insoluble. Pure sulfuric acid reacts violently with water. Stoddard Solvent in pure form combustible liquid (flash point between 100-200$^{o}_{F}$). Acetone, toluene, MEK, and methanol are flammables in pure form (flash points below 100$^{o}$F).

TOPOGRAPHICAL HAZARDS: None

OPERATIONAL HAZARDS:

If any electrical hazards exist on or near concrete pads, such as overhead powerlines, special precautions for steam cleaning maybe necessary. Call health and safety for instructions.

## PERSONAL PROTECTION/TRAINING REQUIREMENTS

RESPIRATORY PROTECTION REQUIREMENT: (Level C/Level D)

One-half mask or full facepiece cartridge respirator with cartridges effective against both organic vapors and toxic aerosols (dust, mists, etc). For MSA equipment, the correct cartridge would be GMA-H. Use during steam cleaning operation mandatory. During other portions of work on-site, downgrading to Level D is permissible if air monitoring shows lack of airborne contaminants.

PROTECTIVE CLOTHING REQUIREMENT:

__X__ WORK CLOTHES/COVERALLS (long sleeved)

__X__ CHEMICAL PROTECTIVE CLOTHING. TYPE? Polyethylene coated tyvek

_____ WORK SHOES (steel toe/shank)

__X__ BOOTS. TYPE? Steel toe chemically resistant boots.

__X__ GLOVES. TYPE? Vinyl Inners/Nitrile Outers.

__X__ HARD HAT

__X__ FACE SHIELD

__X__ SAFETY GLASSES

MODIFICATIONS:

Chemically resistant boots over steel toe work shoes acceptable substitute. Also, full facepiece respirator acceptable substitute for faceshield and safety glasses.

TRAINING REQUIREMENTS:

All site personnel will have received 40 hour training certification for hazardous waste site workers per 29 CFR 1910.120.

HAZARD COMMUNICATION:

ENSR Field Representative will conduct a pre-job health and safety meeting with Contractor employees to familiarize them with all of the health and safety plan requirements.

Note: Good operating procedure would be for contractor to start steam cleaning on downwind side of concrete pads and work backwards such that contractor is, as much possible, upwind of mist generated by steam.

## AIR MONITORING REQUIREMENTS

1) INSTRUMENT: HNu Photoionization Detector

2) INSTRUMENT: Draeger Pump/Colorimetric tubes for more specific readings.

MONITORING PROCEDURE: Periodically monitor breathing zone of workers at different stages of operation (HNu has a photoionization sensitivity of 10.0 for toluene, 5.7 for acetone, 1.0 for methanol, and 6.3 for MEK with an 11.7 eV lamp). You will be measuring a mix of compounds. A conservative action level of 10 units on HNu scale is set to protect against possibility of low TLV compounds. Sustained breathing zone levels below 10 units allow downgrading to Level D (no respirator) except during steam cleaning when respirators are mandatory.

## DECONTAMINATION PROCEDURES

EQUIPMENT/SOLVENTS/SOLUTIONS:

Alconox or equivalent. (Note: Special decon procedures may apply to sampling utensils for quality assurance purposes. See applicable section of ENSR Work Plan).

DECONTAMINATION PROCEDURE(S):

1) ITEM(S): Applies to all personnel protective equipment (i.e., hard hat, boots, gloves, respirator etc.)

PROCEDURE: Setup decon area, wash in basin of alconox solution, rinse in basin of clean water, and dry. (Note: PPE should be stored in a clean, dry location when not in use).

DISPOSAL PROCEDURE:

Disposable items, such as coveralls, are to be sealed in a plastic bag and disposed of in full compliance with client procedures.

NOTE: The above specified decontamination procedures pertain to the decontamination of personal protective equipment only. Procedures for the decontamination of sampling tools or other related equipment should be specified in the subject work plan and/or QA plan.

## EMERGENCY REFERENCE

AMBULANCE: 911

POLICE: 911

FIRE: 911

HOSPITAL: Lakewood Hospital (216) 521-4200
Location: 14519 Detroit Street
Lakewood, OH 44107

DIRECTIONS TO HOSPITAL: MAP INCLUDED? No

(To be determined by ENSR Field Representative upon arrival on-site-prior to start of work).

POISON CONTROL CENTER: 1/216-231-4455 (Cleveland listing)

NATIONAL RESPONSE CENTER: 1/800-424-8802

---

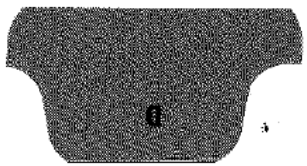
- ENSR REPRESENTATIVES:

| | | |
|---|---|---|
| ENSR/WESTMONT, IL | | 312/887-1700 |
| - BOB MERRILL | | X 311 |
| | | CBI exemption (HOME) |
| ENSR/CONCORD, MA | | |
| - KEVIN POWERS | (QA) | 508/635-9500 |
| ENSR/PITTSBURGH/PA | | |
| - Mark NARDULLI | (PM) | 412/261-2910 |

- AGENCY REPRESENTATIVE:

- CLIENT REPRESENTATIVE:

NEAREST PHONE: To be determined prior to start of on-site activities.



# UNION CARBIDE CORPORATION
# UCAR CARBON COMPANY

Lakewood, OH

ENSR

## CLOSURE PLAN FOR TANK D

**ENSR Consulting and Engineering**

**March 1989**

**Document Number 6900-048**

# UNION CARBIDE CORPORATION
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Lakewood, OH

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# 1.0 INTRODUCTION

## 1.1 Objective of the Document

On April 15 and 28, 1988, Union Carbide Corporation's UCAR Carbon Company (UCAR) received letters from the EPA and OEPA, respectively, requesting the submission of a Part B Permit application for the UCAR facility's hazardous waste storage facilities. In a letter dated September 27, 1988, UCAR stated the intentions of closing these facilities while in interim status and operating them under generator status, thereby eliminating the need to prepare and submit a Part B Permit application.

UCAR maintains this position and intends to close the hazardous waste storage tank, known as Tank D, under interim status. This document provides the methods by which UCAR will attain clean closure of the hazardous waste facility known as Tank D.

## 1.2 Overview of RCRA Closure Requirements

Regulations promulgated by the U.S. Environmental Protection Agency (EPA) on May 19, 1980 and January 12, 1981, and later amended on May 2, 1986, under the authority of the Resource Conservation and Recovery Act (RCRA) require owners/operators of hazardous waste management facilities (HWMFs) to prepare a plan that describes in detail the procedures and identifies the associated estimated costs to formally close HWMFs. The owner or operator of a HWMF is required to comply with the closure and post-closure provisions as specified in 40 CFR 265 Subpart G.

This closure plan outlines the procedures and costs associated with the closure of Storage Tank D at the UCAR facility in Lakewood, Ohio. The plan was developed based upon the closure performance standard specified in 40 CFR 265.111 which states that HWMFs must be closed in a manner that:

a) Minimizes the need for further maintenance;

b) Controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere; and

c) Complies with the closure requirements of 40 CFR 265, Subpart G.

The closure regulations do not stipulate a specific format for closure plans, however, all plans must provide certain minimum information (40 CFR 265.112 (b)):

1) A description of how each HWMF at the facility will be closed according to the closure performance standard;

2) A description of how final closure of the facility will be conducted, including an estimate of the maximum extent of the operations which will be unclosed during the active life of the facility;

3) An estimate of the maximum inventory of wastes in storage or treatment at any time, and a description of methods to be used during closure for removing, transporting, treating, and storing of hazardous waste;

4) A description of steps necessary to decontaminate the facility or render it nonhazardous at closure;

5) A description of other activities necessary during closure to ensure that it satisfies the closure performance standards; and

6) A schedule for final closure activities.

The purpose of the closure cost estimation requirements is to determine the amount of financial assurance needed. The closure cost estimate is based upon the methods of closure described in the closure plan. It must account for managing the maximum inventory expected as indicated in the closure plan. A cost estimate for a given activity must include all costs of supervision, fuel, and maintenance costs for the equipment used, administrative costs, and provisions for contingencies.

Administrative costs include all costs associated with taxes and insurance, as well as costs of routine administration, paperwork, and reporting. The closure cost estimate must be based upon the costs for a third party to close the facility. It may not incorporate any salvage value of hazardous wastes, facility structures or equipment, or land at the time of closure.

Upon approval of the Ohio EPA Director and/or U.S. EPA Administrator, UCAR may amend the closure plan/cost estimate when closure costs are more clearly defined.

With the submission of this plan, UCAR is notifying the State Commissioner and/or EPA Regional Administrator in writing at least 180 days prior to the expected date of final closure.

UCAR will remove all hazardous wastes in storage from the site in accordance with the approved closure plan within 90 days after receiving the final volume of hazardous waste. UCAR will complete partial and final closure activities 180 days after receiving the final volume of hazardous wastes, or within 180 days after approval of the closure plan, if that is later. The Director and/or Administrator may approve a longer closure period if UCAR complies with all applicable requirements for requesting a modification to the permit and demonstrates: (1) that the closure activities will take longer than 180 days to complete, and (2) that all steps have been taken to eliminate any significant threat to human health and the environment from the unclosed but inactive facility.

Within 60 days of completion of final closure, certification by an independent registered professional engineer that the facility has been closed in accordance with the approved closure plan must be submitted to the State Director and/or the EPA Regional Administrator. This certification will be signed by UCAR and the independent registered professional engineer. Documentation supporting the engineer certification will be available upon request until UCAR has been released from the financial assurance requirements.

## 1.3 Organization and Use of Document

This document has been organized to provide the EPA/OEPA with the procedures that UCAR will follow to comply with RCRA closure requirements.

The document has been structured to facilitate the review process of the EPA/OEPA. The document begins by describing the UCAR facility and the HWMF to be closed in Sections 2.0 through 4.0. Following this description, closure related information is provided in Sections 5.0 through 8.0. Additional administrative information, such as closure cost estimates and financial assurance along with closure certification are provided in Sections 10.0 through 12.0.

# 2.0 FACILITY DESCRIPTION

## 2.1 Facility Location

The UCAR plant is a manufacturing facility located in Lakewood, Ohio. The plant is situated within 22 acres of land bordered by Madison Avenue to the north, West 117th Street to the east, Amtrak railroad to the south, and Magee Street to the west. The entire facility is enclosed by a security fence. Entrance to the plant is from the guard station located along Madison Avenue. Figure 2-1 is a plot plan of the facility.

## 2.2 Manufactured Products

The UCAR plant has three major product lines which include: Karbate, GRAFOIL®, and Boron Nitride ceramic products.

Karbate is impervious graphite which consists of graphite and resins. It has been produced at the UCAR plant since 1937. In June 1988, the Karbate process was sold.

GRAFOIL® is flexible graphite made from graphite flake. The graphite flakes are treated, furnaced, and then rolled into sheets of graphite. GRAFOIL® has been replacing asbestos in products such as gaskets and valve packings.

UCAR's third major product line consists of ceramic products such as Boron Nitride, Pyrolytic Boron Nitride, and Pyrolytic Graphite. Boron Nitride is made from material powders. The resulting mixture is put through heating and hot pressure processes resulting in a solid plug. The plug is then machined into various products typically used in the vacuum metalizing industry.

Pyrolytic Boron Nitride and Graphite are made by a gas deposition process to produce crucibles and other shapes which are primarily used in the electronics industry.

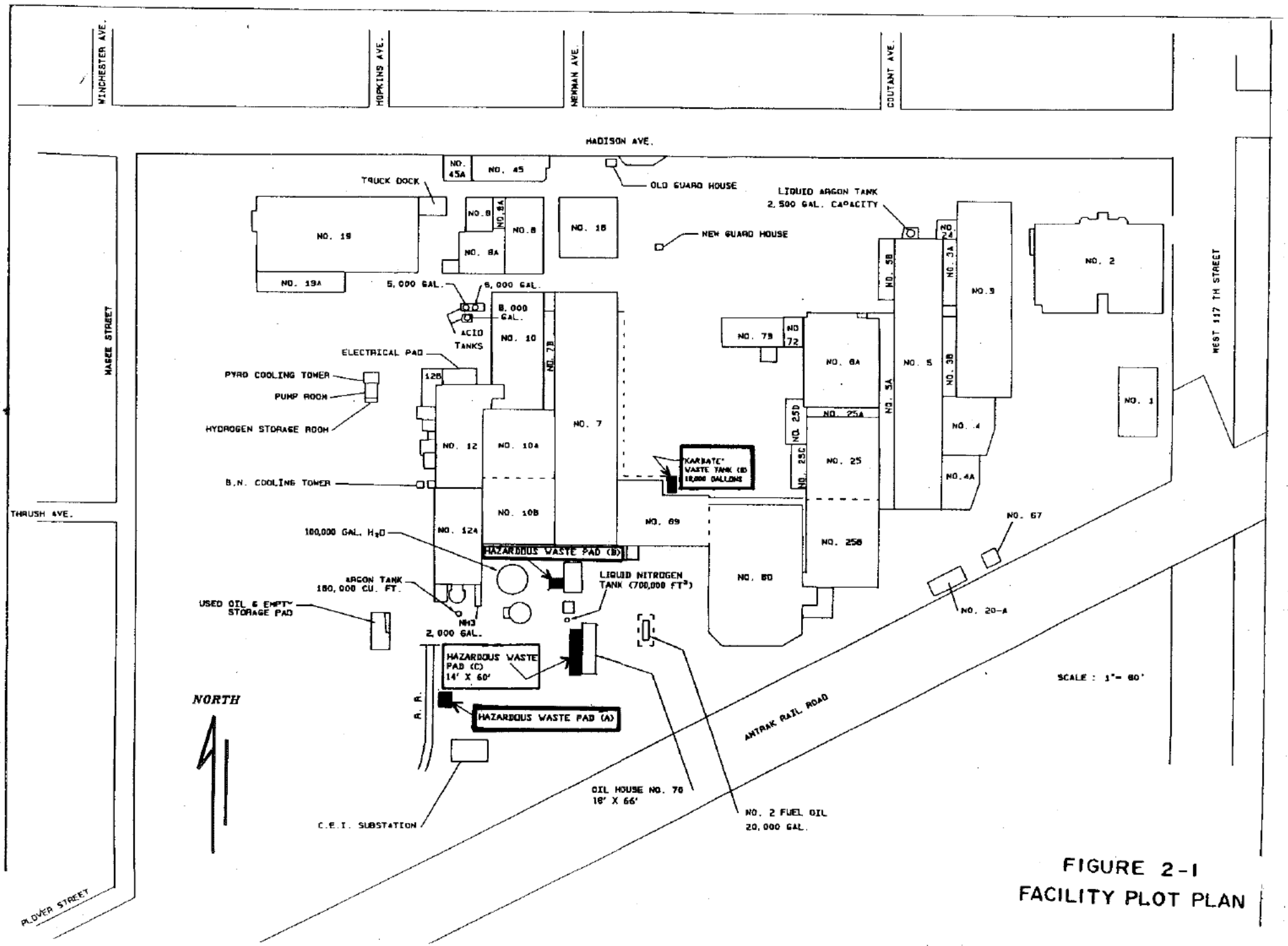



FIGURE 2-1
FACILITY PLOT PLAN

## 2.3 Hazardous Waste Management Facilities

Within the UCAR plant, there are four hazardous waste management facilities (HWMFs) which include three container storage areas (Pads A, B, and C) and one storage tank (Tank D). Descriptive information for each of these HWMFs is listed on Table 2-1. The location of each HWMF is shown on Figure 2-1.

TABLE 2-1
HAZARDOUS WASTE MANAGEMENT FACILITIES INFORMATION

| HWMF | DIMENSIONS | CONSTRUCTION MATERIAL | SECONDARY CONTAINMENT | SUMP DIMENSIONS | TYPE OF FENCING |
|---|---|---|---|---|---|
| Pad A | 16 ft. wide x 20 ft. long x 0.5 ft. thick | Reinforced concrete | 4-inch concrete curbing | 18 inch diameter x 23 inches deep | 7 ft. high steel wire |
| Pad B | 13.5 ft. wide x 17.5 ft. long x 0.5 ft. thick | Reinforced concrete | 4-inch concrete curbing | 15 inch diameter x 19 inches deep | 6 ft. high steel wire |
| Pad C | 14 ft. wide x 60 ft. long | Concrete | None | No sump | No fencing |
| Tank D | 10 ft. diameter x 20.5 ft. length | Mild steel (welded and riveted) | 1 ft - 10 inch high concrete dike | No sump | No fencing |

## 3.0 DESCRIPTION OF HAZARDOUS WASTE MANAGEMENT FACILITY TO BE CLOSED

Storage Tank D is a 12,000-gallon mild steel tank used to store a hazardous waste generated from UCAR's prior Karbate process. The tank is located outside, adjacent to Building 69. It is a horizontal tank measuring 20.5 feet long with a 10 foot diameter. The tank is located within a concrete containment area and is elevated by three 1.5 foot thick concrete support columns. The interior measurements of the containment area are 13 feet wide by 22 feet long by 1 foot-10 inches high. The containment walls are 6 inches thick. Figure 3-1 shows the details of Tank D.

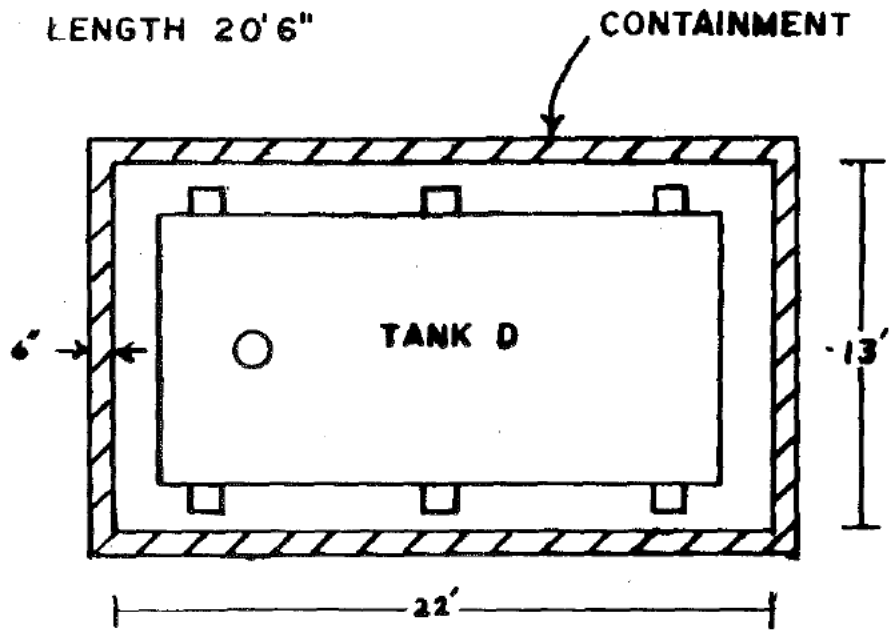
The waste solution stored in Tank D is a liquid mixture of alcohol-based and phenolic-based resin, water and acetone, and a solidified mixture of resins. The tank is classified as a HWMF because the acetone present in the tank is a solvent which carries the EPA identification of F003. The tank has been used in conjunction with UCAR's Karbate process since 1976, and therefore has received the following type of waste. The waste mixture consist of FAPREG P3/acetone and BRL-1100/water. The MSDS for these two resin compounds are included in Appendix II. The actual resins, FAPREG P3 and BRL-1100, in pure form are not hazardous wastes. The individual compounds contained within Tank D are:

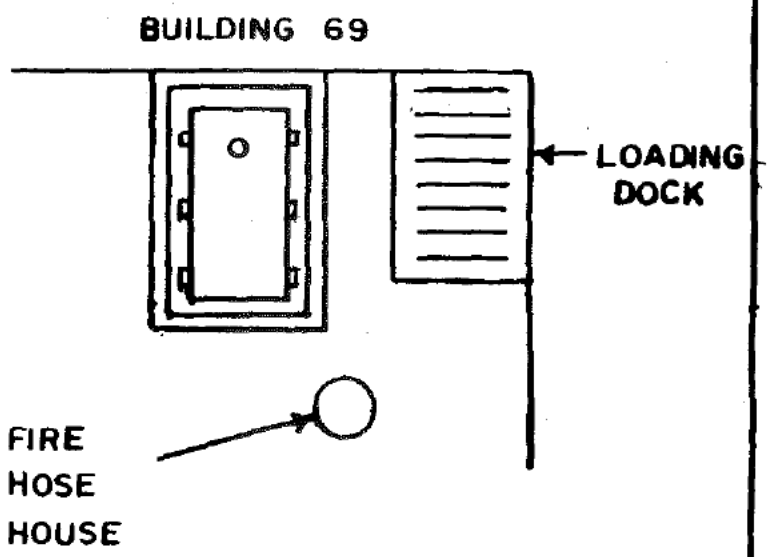
- phenol,
- formaldehyde,
- acetone (F003), and
- phthalic anhydride.

TANK-D DIMENSIONS

10' O.D.

LENGTH 20'6"




LOCATION OF TANK-D

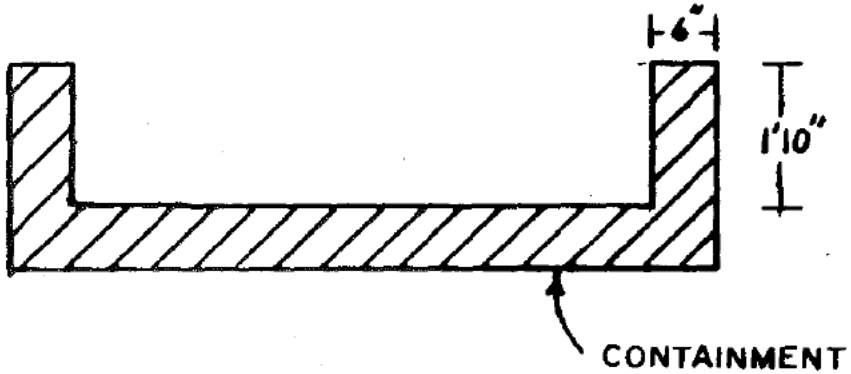



FIGURE 3-1

TANK-D HWMF DETAILS

# 4.0 MAXIMUM WASTE INVENTORY

The maximum waste inventory that can be stored within Tank D is 12,000 gallons. This value is based upon the dimensions of the tank: 10 foot diameter, 20 foot-6 inch length. Half of this volume (6,000 gallons) is assumed to be the solidified resin portion and the other 6,000 gallons is the liquid mixture of resins, water, and acetone.

The maximum waste inventory contained within the tank will be removed within 90 days after initiation of closure activities. The waste will be transported off site for proper disposal.

An estimate of time and cost for this closure activity is presented in Section 10.0.

# 5.0 CLOSURE PERFORMANCE STANDARD

UCAR is proposing to clean close the Tank D HWMF. The method by which UCAR intends to demonstrate clean closure is through chemical analysis of decontaminating rinsate. The analysis that was selected was derived from the type of waste mixture stored in the tank. The quantitative criteria that were selected to demonstrate the absence of contamination resulted from a telephone conversation conducted on 13 February 1989 with EPA, OEPA, UCAR and ENSR representatives. The closure performance standard is discussed in greater detail below.

## 5.1 Sample Collection

Decontamination activities for the Tank D HWMF will include steam cleaning of the containment area. The rinsate will be collected and stored in drums. Samples will be withdrawn from the drums as described in the Sampling Work Plan presented as Appendix I.

## 5.2 Analysis of Decontaminating Rinsate

As previously mentioned, the analytical constituents that have been selected for analysis of the decontaminating rinsate are directly correlated to the types of wastes which were stored at the facility. Tank D has been used in conjunction with UCAR's Karbate process since 1976. Therefore, the same types of hazardous wastes have been stored in the tank. The analytical constituents of concern and detection methods are presented in Table 5-1.

## 5.3 Closure Criteria

The quantitative criteria that have been selected are a function of discussions with the OEPA and EPA. UCAR initially approached the closure of this unit by proposing to conduct

TABLE 5-1

ANALYTICAL CONSTITUENTS
AND
METHODS USED FOR CLOSURE OF TANK D

| Constituent of Concern | Analytical Method | Method Number |
|---|---|---|
| Phenol | GC/MS for semivolatile organics | 8250 |
| Formaldehyde | GC nonhalogenated volatile organics | 8015 |
| Phthalic Anhydride | GC phthalate esters - phthalic acid | 8060 |
| Acetone | GC/MS for volatile organics | 8240 |

representative and random predecontamination sampling for TCLP constituents and criteria. Based on the results of this sampling and analysis, UCAR could determine the existence of contamination at the containment area. This proposal was rejected by the EPA, who suggested analysis of decontaminating rinsate, suggesting that, regardless of the predecontamination sampling results, decontamination would probably be required with analysis of the rinsate.

Therefore, UCAR has revised the closure performance standard to agree with EPA's suggestion. The criteria that were suggested was level of detection for listed organic constituents. The methods by which these constituents will be analyzed have been presented in Section 5.2. Because level of detection is a function analytical procedure and sample matrix, the criteria for listed organic constituents are not quantified but simply noted as the limit of detection. The criteria are presented on Table 5-2. In addition, laboratory quality control and quality assurance documents cannot be included in this plan as they are laboratory specific.

TABLE 5-2
QUANTITATIVE CRITERIA FOR CLEAN CLOSURE
OF UCAR'S TANK D

| Constituent of Concern | EPA ID Number | Quantitative Level |
|---|---|---|
| Phenol | NA* | Level of Detection |
| Formaldehyde | NA | Level of Detection |
| Phthalic Anhydride | NA | Level of Detection |
| Acetone | F003 | Level of Detection |

* Not Applicable

# 6.0 CLOSURE ACTIVITIES

The closure of the Tank D HWMF will involve the removal of the maximum possible waste inventory from the tank, the dismantling of the tank and ancillary piping for disposal at an EPA approved TSDF, and the decontamination of the Tank D containment area. The containment area will be clean closed. The wastes removed from Tank D are hazardous (see Table 5-2) and may be land disposal prohibited by the land disposal prohibitions for solvent wastes per 40CFR268.30. The solidified resins in Tank D will be sampled; the extract of the waste will be analyzed using the TCLP as described in Appendix I. The waste will be treated or disposed in compliance with these regulations. The closure of the Tank D HWMF will consist of seven major work activities:

1) The removal of Tank D contents,
2) The dismantling and removal of Tank D,
3) Decontamination of the containment structure,
4) Confirmation sampling,
5) Contingent second round of decontamination,
6) Management of auxiliary equipment, and
7) Closure certification.

These seven closure activities will be discussed in the following paragraphs.

The maximum waste inventory that can be stored in Tank D is 12,000 gallons. Storage Tank D contains both liquid and solid wastes. The liquid waste consists primarily of acetone, mixed resin, and water; the solid waste is comprised of hardened resins. Closure activities will begin with the removal of the liquid waste from Tank D. A 5,000 gallon tank truck with a vacuum pump will be used to remove the liquid portion of waste from the tank. The wastewater mixture will be transported to an EPA approved off-site TSDF.

The mixture of solidified resins will be sampled as described in the Sampling Work Plan in Appendix I. Following the removal of liquid waste from Tank D, several precautionary steps will be taken to ensure the safe removal of the top portion of Tank D. The tank will be filled with water to a level several inches above the solid waste. Secondly, dry ice (50 to 100 pounds) will be placed into Tank D to form a carbon dioxide environment within the tank. These steps are designed to prevent explosions and/or fires while using the cutting torch. The tank will then be cut horizontally several inches above the solidified waste using a cutting torch. The top portion will be removed with a crane and placed on a pad that is fire resistant (welding blanket) on an impervious surface where it will be cut into manageable pieces. Concurrently, the bottom half of Tank D will be hoisted into a lined roll-off container where a backhoe will be used to remove the solidified resin. A second lined roll-off container will be placed directly next to the first container holding Tank D. Therefore, the backhoe can easily transfer the waste from Tank D to the roll-off container next to Tank D. After the backhoe removes the bulk of the waste, a chipping hammer will be used to remove any residual waste remaining on the tank walls. The maximum amount of waste inventory possible will be removed from Tank D.

After the completion of waste removal from Storage Tank D, the tank will be moved on the same welding blanket on an adjacent impervious surface. The tank will be cut into manageable pieces using a cutting torch; the tank pieces will be loaded into a lined roll-off container for subsequent disposal at an EPA approved TSDF. Ancillary piping will also be removed, cut into pieces, and loaded into the same roll-off for disposal.

Following the removal of the tank, the containment area will be swept clean of any debris. Debris will be drummed and properly disposed. The concrete containment area, including the walls and concrete tank supports, will then be decontaminated

using a steam cleaner. The generated rinsate will be collected using squeegees and pumped into 55-gallon drums. (A more detailed description of decontamination activities are presented in Section 7.0). This activity may occur concurrently with the removal of Tank D contents, tank dismantling and disposal.

After decontamination activities are complete, 20 percent of the drums of rinsate will be sampled via disposable sampling thiefs. The drum samples will be composited into one representative sample. The composite sample will be shipped to an EPA-approved laboratory for analysis as follows: phenol, formaldehyde, phthalic anhydride, and acetone. The drums of rinsate will be stored on concrete Pads A and/or B until the analytical results are received from the laboratory. If the analytical results exceed the criteria listed in Section 5.3, the drummed rinsate will be disposed off site at an approved TSDF. A second round of decontamination will be performed. The criteria, listed in Section 5.3, will again be used to determine if the second decontamination round is sufficient.

If the analytical results from the rinsate are below the listed criteria in Section 5.3, the containment area will be considered "clean". The resulting rinsate will be discharged to the local POTW with appropriate permission.

Following confirmation of closure, auxiliary equipment used throughout the decontaminating and sampling activities will either be disposed of properly or decontaminated by steam cleaning. (A more detailed description of the management of the auxiliary equipment is presented in Section 8.0).

There is no partial closure anticipated for Tank D. The containment area will be clean closed based upon the closure criteria presented in Section 5.0. Therefore, no post closure plan has been included. The closure of Tank D is scheduled for 1989.

# 7.0 DECONTAMINATION

Decontamination procedures for the concrete containment area for Tank D will commence after Tank D has been removed. Decontamination activities will include steam cleaning of the concrete containment area. Wastewaters or rinsate generated during steam cleaning will be collected within the containment area using squeegees and a pump. The collected rinsate will be pumped into clean 55-gallon drums. Twenty percent of the drums will be sampled and analyzed for phenol, formaldehyde, phthalic anhydride, and acetone to confirm decontamination. Samples will be composited into one representative sample. Following sampling activities, the drums containing the rinsate will be stored on Pads A and/or B until the analytical results have been received. Depending upon the results, the drums will either be shipped off site as hazardous waste to an approved TSDF or the drum's contents will be discharged to the local POTW. Appropriate approvals will be obtained prior to the use of either option. Precautions will be taken during decontamination procedures to ensure that all of the rinsate is collected. Decontamination of the area will be confirmed if the closure criteria specified in Section 5.3 are met. If necessary, a second round of decontamination will be repeated in order to meet the closure criteria.

Personnel will follow the requirements of the Health and Safety Plan included in Appendix I which ensures that the appropriate personal protective equipment will be worn during all stages of closure.

No soil contamination is anticipated beneath the containment area. There are no visible signs of cracks or spalling on the concrete containment pad. Therefore, there is no reason to suspect contamination beneath the containment structure.

All work will be performed in strict accordance with applicable federal, state, and local health, fire and safety regulations. An estimate of time and costs for these closure activities is presented in Section 10.0.

# 8.0 MANAGEMENT OF AUXILIARY EQUIPMENT

The auxiliary equipment used during closure activities, i.e., sampling equipment and personal protective gear, will be containerized in 55-gallon drums and transported off site for appropriate disposal. The pumps used to transfer wastes from the tank, reusable protective gear, and any other equipment such as the backhoe bucket, chipping hammer, picks, shovels, etc. will be decontaminated by steam cleaning. This equipment will be steam cleaned in the bottom portion of the tank after waste removal in order to collect rinsate. The rinsate will be pumped from the tank to 55-gallon drums and transported off site for appropriate disposal.

All work will be performed in strict accordance with applicable federal, state, and local health, fire and safety regulations. An estimate of time and costs for this closure activity is presented in Section 10.0.

# 9.0 SCHEDULE FOR CLOSURE

The closure of Tank D is expected to be performed in 1989. With the submission of this plan, UCAR is notifying the State Commissioner and/or EPA Regional Administrator in writing at least 180 days prior to the expected date of final closure. Closure activities will terminate no later than 180 days after receiving EPA approval of the closure plan and after receiving the final volume of wastes. Table 9-1 presents a milestone schedule to be followed as a guideline for closure activities.

TABLE 9-1

MILESTONES FOR CLOSURE OF CONTAINER STORAGE AREA
TANK D

| | Closure Activity | Maximum Time from Initiation of Final Closure to Completion of Closure Activity |
|---|---|---|
| 1. | EPA approval | 1 day |
| 2. | Removal of waste inventory | 80 days |
| 3. | Dismantling and removal of Tank D | 90 days |
| 4. | Decontamination of Containment Area | 100 days |
| 5. | Confirmation sampling of containment area | 110 days |
| 6. | Receipt of analytical results | 160 days |
| 7. | Auxiliary equipment disposal or decontamination | 170 days |
| 8. | Completion of closure | 180 days |
| 9. | Certification of closure completion by a registered professional engineer | 240 days |

# 10.0 CLOSURE COST ESTIMATE

Closure of Tank D will involve seven major activities which include: 1) removal of the waste inventory, 2) dismantling and removal of Tank D, 3) decontamination of the containment area, 4) confirmation sampling, 5) contingent second round of decontamination, 6) management of auxiliary equipment, and 7) closure certification. This section of the closure plan identifies the assumptions made to develop the costs associated with the above-mentioned closure activities.

As required by 40CFR265.142, the cost estimate has been based upon the point in the facility's active life which would make closure costs the most expensive.

The cost estimate is based upon the waste inventory and other hazardous wastes generated during decontamination activities being disposed as hazardous waste at an approved off-site TSDF. Hazardous waste transportation/disposal costs are based on past costs for these wastes and information obtained from haulers and TSDFs. Costs for labor and equipment for the other closure activities were derived from the MEANS Site Work Cost Data, 1989 edition and from the Final Report Guidance Manual: Cost Estimates for Closure and Post-Closure Plans, (Subparts G and H), Volume I, II, III, and IV, November 1986, U.S. Department of Commerce, NTIS. Analytical service costs were derived from the 1989 ENSR Analytical Laboratories Price Schedule. All costs are based on 1989 dollars. Other miscellaneous assumptions were based on best engineering judgment.

Table 10-1 presents a worksheet which itemizes the individual work items involved in implementing each major closure activity. Refer to this table throughout the description of each closure activity for a breakdown of individual costs for each work item.

The assumptions associated with each of the seven major closure activities are described in the sections that follow.

TABLE 10-1: CLOSURE COST ESTIMATE FOR STORAGE TANK D HWMF

| | QUANTITY | UNIT COST | UNITS | TOTAL COSTS | SUBTOTALS | COMMENTS |
|---|---|---|---|---|---|---|
| 10.1 REMOVAL OF MAXIMUM WASTE INVENTORY | | | | | | |
| REMOVAL OF LIQUID WASTE MIXTURE | | | | | | LIQUIDS VACUUM PUMPED INTO TANK TRUCKS-6000 GALS |
| EQUIPMENT: | | | | | | |
| 2 5000-GAL TANK TRUCKS | | | | | | |
| FIRST HOUR RATE | 2 | $75.00 | HR | $150.00 | | FIRST HOUR PUMPING CHARGE FOR 2 TANK TRUCKS, |
| ADDITIONAL HOURS RATE | 6 | $60.00 | HR | $360.00 | | BOTH TRUCKS WITH 3 ADDITIONAL HRS EACH |
| TRANSPORTATION | 2 | $2,500.00 | TRIP | $5,000.00 | | PAST COST, 2 TRUCKS, 6000 GALS |
| DISPOSAL-INCINERATOR | 48000 | $0.16 | LB | $7,680.00 | | PAST COST, DENSITY OF LIQUID WASTES ~8 LBS/GAL |
| CUTTING OFF TOP PORTION OF THE TANK | | | | | | |
| MATERIAL: | | | | | | |
| DRY ICE | 2 | $100.00 | BLOCK | $200.00 | | 2 50# BLOCKS OF DRY ICE |
| CANVAS SHEETING (DUCT MATTING) | 1 | $200.00 | LP-SUM | $200.00 | | FOR PLACEMENT OF TOP PORTION OF TANK |
| EQUIPMENT: | | | | | | |
| CUTTING TORCH | 1 | $18.00 | DAY | $18.00 | | |
| OPERATING COSTS | 8 | $5.80 | HR | $46.40 | | |
| CRANE, 33 TON | 1 | $850.00 | DAY | $850.00 | | |
| OPERATING COSTS | 8 | $15.65 | HR | $125.20 | | |
| LABOR: | | | | | | |
| 2 BUILDING LABORERS | 2 | $25.40 | HR | $50.80 | | 1 HR EACH NEEDED FOR DISTRIB. OF DRY ICE |
| 2 PIPEFITTERS | 16 | $36.30 | HR | $580.80 | | LABOR COST FOR CUTTING OF TANK |
| 1 CRANE OPERATOR- HVY EQUIP | 8 | $33.25 | HR | $266.00 | | |
| REMOVAL OF SOLIDIFIED RESINS | | | | | | |
| MATERIAL: | | | | | | |
| 2 ROLL-OFF BOXES | | | | | | |
| DROP-OFF CHARGE | 2 | $500.00 | EACH | $1,000.00 | | DROP-OFF CHARGE FOR 2 ROLL-OFF BOXES |
| RENTAL FEE | 2 | $56.25 | WEEK | $112.50 | | ONE WEEK CHARGE FOR 2 BOXES |
| CANVAS SHEETING (DUCT MATTING) | 1 | $200.00 | LP-SUM | $200.00 | | SURROUNDING ROLL-OFF BOXES |
| EQUIPMENT: | | | | | | |
| CRANE | TIME HAS BEEN INCLUDED IN THE CUTTING OFF OF THE TOP OF THE TANK | | | | | |
| BACKHOE, 1/2 CY | 2 | $415.00 | DAY | $830.00 | | |
| OPERATING COSTS | 16 | $8.60 | HR | $137.60 | | |
| CHIPPING HAMMER | 3 | $14.00 | DAY | $42.00 | | |
| OPERATING COSTS | 24 | $0.10 | HR | $2.40 | | |
| LABOR: | | | | | | |
| 1 CRANE OPERATOR- HVY EQUIP | TIME HAS BEEN INCLUDED IN THE CUTTING OFF OF THE TOP OF THE TANK | | | | | |
| 1 BACKHOE OPERATOR-HVY EQUIP | 16 | $33.25 | HR | $532.00 | | |
| 2 BUILDING LABORERS | 80 | $25.40 | HR | $2,032.00 | | |
| HEALTH & SAFETY COST FOR EXCAVATION ACTIVITIES | 1 | $3,576.00 | LP-SUM | $3,576.00 | | 100% OF THE COST FOR REMOVING(EXCAVATING) CONTAMINATED MATERIAL |
| SAMPLING OF SOLIDIFIED RESINS | | | | | | |
| EQUIPMENT: | | | | | | |
| SAMPLERS | 5 | $20.00 | EACH | $100.00 | | |
| LABOR: | | | | | | |
| 1 FIELD TECHNICIAN | 5 | $25.00 | HR | $125.00 | | |
| SHIPMENT OF SAMPLE | 1 | $50.00 | SHIPMT | $50.00 | | |
| ANALYSIS: | | | | | | |
| TCLP | 1 | $1,500.00 | SAMPLE | $1,500.00 | | |

TABLE 10-1: CLOSURE COST ESTIMATE FOR STORAGE TANK D HWMF

| | QUANTITY | UNIT COST | UNITS | TOTAL COSTS | SUBTOTALS | COMMENTS |
|---|---|---|---|---|---|---|
| 10.1 REMOVAL OF MAXIMUM WASTE INVENTORY-(CONTINUED) | | | | | | |
| DISPOSAL OF SOLIDIFIED RESINS | | | | | | |
| TRANSPORTATION | 1 | $2,500.00 | TRIP | $2,500.00 | | PAST COST |
| DISPOSAL-INCINERATOR | 30 | $1,500.00 | TON | $45,000.00 | | TYPICAL COST, 6000 GALS--DENSITY ~10 LBS/GAL |
| HIGH-PRESSURED STEAM CLEANING OF BACKHOE BUCKET AND CHIPPING HAMMER | | | | | | |
| EQUIPMENT: | | | | | | |
| STEAM CLEANER | 1 | $43.00 | DAY | $43.00 | | RENTAL FOR 1 DAY; OPERATION FOR ~2 HOURS |
| OPERATING COSTS | 2 | $0.57 | HR | $1.14 | | |
| LABOR: | | | | | | |
| 1 BUILDING LABORER | 2 | $25.40 | HR | $50.80 | | LABOR COST |
| MANAGEMENT OF DECONTAMINATION RINSATE-VACUUM PUMPED INTO TANK TRUCK | | | | | | |
| EQUIPMENT: | | | | | | |
| 1 TANK TRUCK | | | | | | |
| FIRST HOUR RATE | 1 | $75.00 | HR | $75.00 | | INITIAL HOUR CHARGE FOR 1 TRUCK |
| ADDITIONAL HOURS RATE | 3 | $60.00 | HR | $180.00 | | INCL 2 HRS FOR REMOVING THIN WATER LAYER IN TANK |
| TRANSPORTATION | 1 | $2,500.00 | TRIP | $2,500.00 | | PAST COST |
| OFF-SITE TREATMENT | 450 | $0.50 | GAL | $225.00 | | 400 GALS-DECONTAMINATION, 50 GALS-WATER LAYER |
| SUBTOTAL | | | | | $76,341.64 | |
| 10.2 DISMANTLING AND REMOVAL OF TANK D | | | | | | |
| TORCH CUTTING OF TANK | | | | | | |
| EQUIPMENT: | | | | | | |
| CRANE, 33 TON | 1 | $850.00 | DAY | $850.00 | | |
| OPERATING COSTS | 8 | $15.65 | HR | $125.20 | | |
| CUTTING TORCH | 3 | $18.00 | DAY | $54.00 | | ONE TORCH RENTED FOR THREE DAYS |
| OPERATING COSTS | 24 | $5.80 | HR | $139.20 | | |
| FORKLIFT | 8 | $20.60 | HR | $164.80 | | |
| LABOR: | | | | | | |
| 1 CRANE OPERATOR-HVY EQUIP | 8 | $33.25 | HR | $266.00 | | |
| 2 PIPEFITTERS | 48 | $36.30 | HR | $1,742.40 | | |
| 2 BUILDING LABORERS | 16 | $25.40 | HR | $406.40 | | |
| TRANSPORTATION | 1 | $2,500.00 | TRIP | $2,500.00 | | |
| DISPOSAL-INCINERATION | 7 | $3,000.00 | TON | $21,000.00 | | ASSUMES 1/4" STEEL, 500 LF OF PIPING, 490 LB/CF |
| SUBTOTAL | | | | | $27,248.00 | |

TABLE 10-1: CLOSURE COST ESTIMATE FOR STORAGE TANK D HWMF

| | QUANTITY | UNIT COST | UNITS | TOTAL COSTS | SUBTOTALS | COMMENTS |
|---|---|---|---|---|---|---|
| 10.3 DECONTAMINATION OF CONTAINMENT AREA | | | | | | |
| GENERAL CLEANING OF AREA: BUILDING LABORER | 1 | $25.40 | HR | $25.40 | | LABOR COST FOR BROOM SWEEPING |
| STEAM CLEANING: CLEAN APPROX. 50 SF PER HOUR | | | | | | |
| EQUIPMENT: | | | | | | |
| STEAM CLEANER, 200 GPH | 1 | $43.00 | DAY | $43.00 | | RENTAL FOR 1 DAY; ~6 HOURS FOR 286 SF AREA |
| OPERATING COSTS | 6 | $0.57 | HR | $3.42 | | |
| LABOR: | | | | | | |
| 1 BUILDING LABORER | 6 | $25.40 | HR | $152.40 | | LABOR COST |
| MANAGEMENT OF DECONTAMINATION WASHWATERS- DRUM THE RINSATE | | | | | | |
| LABOR: | | | | | | |
| 1 BUILDING LABORER | 6 | $25.40 | HR | $152.40 | | LABOR COST |
| PURCHASE OF DRUMS | 21 | $50.00 | DRUM | $1,050.00 | | PRICE FOR NEW DRUMS-VENDOR QUOTE |
| PLACE DRUMS ONTO STORAGE PAD(S) | | | | | | |
| EQUIPMENT: | | | | | | |
| FORKLIFT | 2 | $20.60 | HR | $41.20 | | ASSUME UCAR OWNS THE FORKLIFT; OPERATING CHARGE |
| LABOR: | | | | | | NUMBER OF GENERATED RINSATE DRUMS: 21 |
| 1 BUILDING LABORER | 2 | $25.40 | HR | $50.80 | | LABOR COST |
| 1 LIGHT EQUIP OPERATOR | 2 | $30.60 | HR | $61.20 | | LABOR COST FOR FORKLIFT DRIVER |
| PROTECTIVE CLOTHING/EQUIPMENT FOR ALL DECONTAMINATION ACTIVITIES | 2 | $85.00 | PERSON | $170.00 | | INCL. SPLASH SUIT, SHOE COVERS, APRON, GLOVES, GOGGLES, HALF-MASK RESPIRATOR, AND HARD HAT. COSTS TO ACCOUNT FOR POTENTIAL HAZARDS |
| SUBTOTAL | | | | | $1,749.82 | |
| 10.4 CONFIRMATION SAMPLING | | | | | | |
| DRUM SAMPLING: | | | | | | |
| EQUIPMENT: | | | | | | |
| DISPOSABLE SAMPLERS | 5 | $20.00 | EACH | $100.00 | | |
| LABOR: | | | | | | |
| 1 FIELD TECHNICIAN | 5 | $25.00 | HR | $125.00 | | 1 HR/SAMPLE REQUIRED TO COLLECT,PRESERVE AND LOG. |
| SHIPMENT OF SAMPLE | 1 | $50.00 | SHIPMT | $50.00 | | INC. SHIPPING COSTS AND SUPPLIES(ie. COOLER, ICE) |
| LAB ANALYSIS: | | | | | | |
| VOLATILES | 1 | $230.00 | SAMPLE | $230.00 | | |
| SEMI-VOLATILES | 1 | $400.00 | SAMPLE | $400.00 | | |
| PHTHALATE ESTERS/ PHTHALATE ACIDS | 1 | $180.00 | SAMPLE | $180.00 | | |
| SUBTOTAL | | | | | $1,085.00 | |

TABLE 10-1: CLOSURE COST ESTIMATE FOR STORAGE TANK D HWMF

| | QUANTITY | UNIT COST | UNITS | TOTAL COSTS | SUBTOTALS | COMMENTS |
|---|---|---|---|---|---|---|
| 10.5 CONTINGENT SECOND ROUND DECONTAMINATION | | | | | | |
| MANAGEMENT OF CONTAMINATED RINSATE | | | | | | |
| TRANSPORTATION | 250 | $3.60 | LD-MILE | $900.00 | | 80 DRUMS/TRUCKLOAD;250 MILES DISTANCE TO FACILITY |
| OFF-SITE TREATMENT (21 DRUMS) | 1155 | $0.50 | GAL | $577.50 | | TYPICAL COMMERCIAL HAZARDOUS WASTE TREATMENT COST |
| STEAM CLEANING: CLEAN APPROX. 50 SF PER HOUR | | | | | | |
| EQUIPMENT: | | | | | | |
| STEAM CLEANER, 200 GPH | 1 | $43.00 | DAY | $43.00 | | RENTAL FOR 1 DAY; ~6 HOURS FOR 286 SF AREA |
| OPERATING COSTS | 6 | $0.57 | HR | $3.42 | | |
| LABOR: | | | | | | |
| BUILDING LABORER | 6 | $25.40 | HR | $152.40 | | LABOR COST |
| MANAGEMENT OF DECONTAMINATION WASHWATERS- DRUM THE RINSATE | | | | | | |
| LABOR: | | | | | | |
| 1 BUILDING LABORER | 6 | $25.40 | HR | $152.40 | | LABOR COST |
| PURCHASE OF DRUMS | 21 | $50.00 | DRUM | $1,050.00 | | PRICE FOR NEW DRUMS-VENDOR QUOTE |
| PLACE DRUMS ONTO STORAGE PAD(S) | | | | | | |
| EQUIPMENT: | | | | | | |
| FORK LIFT | 2 | $20.60 | HR | $41.20 | | ASSUME UCAR OWNS THE FORKLIFT; OPERATING CHARGE |
| LABOR: | | | | | | NUMBER OF GENERATED RINSATE DRUMS: 21 |
| 1 BUILDING LABORER | 2 | $25.40 | HR | $50.80 | | LABOR COST |
| 1 LIGHT EQUIP OPERATOR | 2 | $30.60 | HR | $61.20 | | LABOR COST FOR FORKLIFT DRIVER |
| PROTECTIVE CLOTHING/EQUIPMENT FOR ALL DECONTAMINATION ACTIVITIES | 2 | $85.00 | PERSON | $170.00 | | INCL. SPLASH SUIT, SHOE COVERS, APRON, GLOVES, GOGGLES, HALF-MASK RESPIRATOR, AND HARD HAT. |
| DRUM SAMPLING: | | | | | | |
| EQUIPMENT: | | | | | | |
| DISPOSABLE SAMPLERS | 5 | $20.00 | EACH | $100.00 | | |
| LABOR: | | | | | | |
| 1 FIELD TECHNICIAN | 5 | $25.00 | HR | $125.00 | | 1 HR/SAMPLE REQUIRED TO COLLECT,PRESERVE AND LOG. |
| SHIPMENT OF SAMPLE | 1 | $50.00 | SHIPMT | $50.00 | | INC. SHIPPING COSTS AND SUPPLIES(ie. COOLER, ICE) |
| LAB ANALYSIS: | | | | | | |
| VOLATILES | 1 | $230.00 | SAMPLE | $230.00 | | |
| SEMI-VOLATILES | 1 | $400.00 | SAMPLE | $400.00 | | |
| PHTHALATE ESTERS/ PHTHALATE ACIDS | 1 | $180.00 | SAMPLE | $180.00 | | |
| MANAGEMENT OF SECOND ROUND RINSATE: | | | | | | |
| DISCHARGE TO POTW | 1375 | $0.00 | GAL | $0.00 | | ASSUME POTW COST IS NEGLIGIBLE |
| SUBTOTAL | | | | | $4,286.92 | |

TABLE 10-1: CLOSURE COST ESTIMATE FOR STORAGE TANK D HWMF

| | QUANTITY | UNIT COST | UNITS | TOTAL COSTS | SUBTOTALS | COMMENTS |
|---|---|---|---|---|---|---|
| 10.6 MANAGEMENT OF AUXILIARY EQUIPMENT | | | | | | |
| DISPOSABLE GEAR | | | | | | |
| LABOR: | | | | | | |
| 1 BUILDING LABORER | 4 | $25.40 | HR | $101.60 | | ONE LABORER REQUIRED FOR 4 HOURS |
| TRANSPORTATION | 250 | $3.60 | LD-MILE | $900.00 | | |
| DISPOSAL-INCINERATION | 0.05 | $1,000.00 | TON | $50.00 | | ASSUME 100 POUNDS OF SOLID WASTE GENERATED |
| SUBTOTAL | | | | | $1,051.60 | |
| 10.7 PROFESSIONAL CERTIFICATION | | | | | | |
| PERIODICAL INSPECTION AND DOCUMENTATION | 36 | $50.00 | HR | $1,800.00 | | REGISTERED INDEP PROFESS ENGINEER, INC 3 INSPECTS W/REPORTS, REVIEW PLAN, AND FINAL DOCUMENTATION |
| ADMINISTRATIVE - CLERICAL LABOR | 12 | $19.00 | HR | $228.00 | | 4 HOURS/WEEK FOR 3 WEEKS |
| SUBTOTAL | | | | | $2,028.00 | |
| TOTAL DIRECT CAPITAL COSTS | | | | | $113,790.98 | |
| INDIRECT COSTS | | | | | | |
| ADMINISTRATIVE AND SUPERVISORY (15% OF DIRECT CAPITAL COSTS) | | | | | $17,068.65 | |
| CONTINGENCY FEE (10% OF DCC) | | | | | $11,379.10 | |
| TOTAL | | | | | $142,238.73 | |

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## 10.1 Removal of Maximum Waste Inventory

The maximum waste inventory that can be stored with Tank D is 12,000 gallons. This value is based on the dimensions of the tank. For costing purposes, half of the contents are assumed to be the solidified resins and the other half are assumed to be the liquid mixture containing resins, acetone, and water. At the initiation of closure, the liquid waste portion within the tank will be pumped into a tank truck and transported off site to an EPA approved TSDF. It is estimated that two-5,000 gallon tank trucks with vacuum pumps will be required for four hours each for the transport of these wastes off site. Costing for this activity is based upon typical expenses UCAR has previously incurred.

To facilitate the removal of the solidified resins in the bottom of the tank, the top portion of Tank D will be cut off using a cutting torch. Prior to cutting the tank, a two-man crew of building laborers will be required for one hour each to distribute approximately 50 to 100 pounds of dry ice into the tank. Tank cutting activities will require a three-man crew including two pipefitters and one crane operator for eight hours each. A cutting torch will be rented for one day and operated for eight hours. A crane will be used to remove the top portion of the tank onto canvas-type sheeting (welding blanket).

For the removal of the solidified resins from the bottom portion of the tank, two lined roll-off boxes will be rented for a week. Canvas sheeting will be placed around the roll-offs. The bottom portion of the tank containing the solidified resins will be lifted by a crane into one of the lined roll-off boxes. The resins will be removed from the tank and placed into the second lined roll-off box using a backhoe and chipping hammer. The backhoe will be rented for two days and operated for sixteen hours, and the chipping hammer will be rented for three days and operated for twenty-four hours. A backhoe operator will be required for sixteen hours and two building laborers for forty

hours each. A health and safety cost of one hundred percent of the cost for excavating the resins has been included to account for potential hazards.

Following resin removal activities the solidified resins will be randomly and representatively sampled as described in the Sampling Work Plan presented in Appendix I. As calculated in the Work Plan, five samples will be collected. A field technician will be required for five hours to collect, preserve, and log the samples. The five samples will be composited into one representative sample which will be analyzed for the treatment standards for F001 through F005 spent solvent wastes to determine if the solidified resins can be land disposed. A shipping charge of fifty dollars has been included. For this cost estimate, it has been assumed that the solidified resins will be sent off site to an EPA approved incinerator. Based upon a density of ten pounds per gallon, thirty tons of material will be incinerated.

For the cleaning of the backhoe bucket and chipping hammer, a steam cleaner will be rented for one day and operated two hours. A tank truck with vacuum pump will be required for four hours. Typical off-site transportation and treatment costs for the rinsate have been used in the estimate. The total cost for removal of the maximum waste inventory contained within Tank D as shown in Table 10-1 is approximately $76,000.

## 10.2 Dismantling and Removal of Tank D

Tank D will be cut into pieces which are amenable to transportation and disposal at an EPA approved TSDF. An incineration facility has been assumed for costing purposes only. This activity will require a cutting torch and 2 pipefitters for 24 hours each. A crane with an operator will be required for 8 hours for lifting the tank. A forklift and 2 laborers (8 hours each) will be necessary to load the metal pieces into a roll-off container. Ancillary piping will also be removed and placed in

the lined roll-off container. The costs for this activity are summarized in Table 10-1; total costs are estimated to be $27,000.

## 10.3 Decontamination of the Containment Area

The activity of decontamination of the containment area of Tank D will require a one-man crew for 6 hours to steam clean the concrete containment area. It was estimated that the containment area will have approximately 286 square feet requiring steam cleaning. This value was based on the dimensions of the containment area, 13 feet by 22 feet. Approximately 50 square feet of area can be steam cleaned per hour. A 200-gallon per hours steam cleaner will be rented for one day and operated for 6 hours.

The rinsate will be collected from within the containment area and pumped to a series of 55-gallon drums. New drums will be purchased. Approximately 21 drums of rinsate will be generated. A laborer will be required for 6 hours to manage the generated rinsate.

Protective clothing will be required for a two man crew. This may include a splash suit, shoe covers, an apron, gloves, goggles, a half-mask respirator, and a hard hat for each man.

Following sampling, the drums of rinsate will be replaced on Pads A and/or B while awaiting the analytical results. A two-man crew with a forklift will be required for two hours each to move the drums onto the pad.

As shown on Table 10-1, the total cost for decontaminating the containment area is approximately $1,700.

## 10.4 Confirmation Sampling

As stated in the Sampling Work Plan (Appendix I), 20 percent of the generated drums of rinsate will be sampled to confirm decontamination of the containment area. Therefore, 5 drums will be sampled for the containment area of Tank D (the calculation is

presented in Appendix I). Five disposable samplers will be purchased. A field technician will be required for 5 hours to collect, preserve, and log the samples. The drum samples will then be composited into one representative rinsate sample. The composite sample will be sent for analysis of volatiles, semi-volatiles and phthalate ester/phthalate acids as described in Section 5.3. A shipping charge of $50 per shipment has been included. The total cost for confirmation sampling and analysis is approximately $1,100.

## 10.5 Contingent Second Round Decontamination

In the unlikely event that a second round of decontamination is required based on the analytical results from the rinsate, the 21 drums of rinsate will be loaded onto a truck and transported to an approved TSDF. For purposes of this cost estimate, the costs have been based upon typical costs for treatment at an approved hazardous waste treatment facility located approximately 250 miles away. Typical transportation and treatment costs are $3.60 per loaded mile, and $0.50 per gallon, respectively.

The remaining activities under this second round of decontamination will replicate those presented in Section 10.2 (steam cleaning and management of the rinsate) and Section 10.3 (sampling and analysis of the rinsate).

For this cost estimate, it is assumed that the analytical results of the second round of rinsate are below the closure criteria and the rinsate can be discharged to the local POTW with negligible costs incurred. Therefore, the total cost for the contingent second round of decontamination is approximately $4,300.

## 10.6 Management of Auxiliary Equipment

An estimated one container (55 gallon drum) of disposable gear (e.g., brooms, sampling thiefs, splash suit, gloves) weighing approximately 100 pounds will be collected during the

course of facility closure. This drum will be disposed as solid hazardous waste at an approved off-site incinerator. A laborer will be required for 4 hours to manage the waste. Transportation costs are based upon the 250 mile trip at a cost of $3.60 per loaded mile. Incineration costs are estimated at $1,000 per ton. The disposal of rinsate waters generated during the decontamination of heavy equipment used to remove solids from Tank D is discussed in Section 10.1. The total cost for this closure activity is approximately $1,100.

## 10.7 Professional Certification

Assume that 36 hours will be required for a registered independent professional engineer to oversee closure and certify that the facility has been closed in accordance with the closure plan. This includes time to review the closure plan, time for three site inspections with draft reports, and time for final documentation.

Assume that 12 hours will be required from the owner's or operator's staff for administrative duties and clerical work. Therefore, the total cost of professional certification is approximately $2,000.

## 10.8 Total Costs Including Indirect Costs

A summary of the estimated closure costs for Tank D is presented on Table 10-2. The total direct capital cost for the closure activities is approximately $114,000. A general provision for contingencies of 10 percent of the direct capital costs has been added. For administrative tasks including taxes, insurances, and supervision not listed elsewhere, an additional cost equal to 15 percent of the total direct capital cost has also been added. Therefore, the total cost for closing Tank D is approximately $142,000.

TABLE 10-2: SUMMARY OF CLOSURE COSTS FOR TANK D HWMF

| | CLOSURE ACTIVITY | COST |
|---|---|---|
| 10.1 | REMOVAL OF MAXIMUM WASTE INVENTORY | $76,341.64 |
| 10.2 | DISMANTLING AND REMOVAL OF TANK D | $27,248.00 |
| 10.3 | DECONTAMINATION OF CONTAINMENT AREA | $1,749.82 |
| 10.4 | CONFIRMATION SAMPLING | $1,085.00 |
| 10.5 | CONTINGENT SECOND ROUND DECONTAMINATION | $4,286.92 |
| 10.6 | MANAGEMENT OF AUXILIARY EQUIPMENT | $1,051.60 |
| 10.7 | PROFESSIONAL CERTIFICATION | $2,028.00 |
| | TOTAL DIRECT CAPITAL COSTS | $113,790.98 |
| | INDIRECT COSTS: | |
| | ADMINISTRATIVE AND SUPERVISORY (15% OF DCC) | $17,068.65 |
| | CONTINGENCY FEE (10% OF DCC) | $11,379.10 |
| | TOTAL COSTS | $142,238.73 |

(ucc-tnkd)

# 11.0 FINANCIAL ASSURANCE

The financial test and corporate guarantee for closure have been met pursuant to 40 CFR 265.143. UCAR's financial mechanism is included on the pages that follow.

UNION CARBIDE CORPORATION 39 OLD RIDGEBURY ROAD, DANBURY, CT 06817-0001

CAROLYN A. O'BOYLE
MANAGER
BANKING DEPARTMENT

October 17, 1988

Ms. J. Kwasniewski
RCRA Enforcement Section
Division of Solid and
Hazardous Waste Management
Ohio Environmental Protection Agency
P. O. Box 1049
1800 Water Mark Drive
Columbus, OH 43266-0149

Dear Ms. Kwasniewski:

Subject: Financial Assurance
Closure and Post-Closure
Hazardous Waste Management Facility

Attached is the revised Schedule A for the Trust Agreement dated as of April 30, 1987, between Union Carbide Corporation, the Grantor, and Chemical Bank, the Trustee. The closure costs for the Lakewood Plant on Scheduled A have been increased to $70,000 from $68,000. Schedule B was revised to reflect an increase of $1,000, which reflects the change for Lakewood.

Also, the EPA ID number for the Parma Facility was corrected to OHD 003926748.

Very truly yours,

Carolyn A. O'Boyle

CAO'B:kbc

Attachment

Copy to: Mr. G. McFarland, Chemical Bank, NY

Blind Copy to: D. Mieskowski
J. Petros
H. T. Prossa

0066B:88

## SCHEDULE A *

| | |
|---|---|
| Union Carbide Corporation - Lakewood Plant | |
| EPA ID No. OHO 004167383 | |
| Lakewood, OH | |
| Closure Costs | $ 70,000 (R) |
| Post-Closure Costs | - 0 - |

| | |
|---|---|
| Union Carbide Corporation - Parma Facility | |
| EPA ID NO. OHD 003926748 | |
| Parma, OH | |
| Closure Costs | $ 119,000 |
| Post-Closure Costs | - 0 - |

| | |
|---|---|
| L-Tec Company - Ashtabula Plant | |
| EPA ID NO. OHO 000821454 | |
| Ashtabula, OH | |
| Closure Costs | $1,463,000 |
| Post-Closure Costs | $ 553,000 |

* Revised as of 09/21/88

0066B:12//

SCHEDULE B *

Union Carbide Corporation - Lakewood and Parma, OH
L-Tec Company - Ashtabula, OH

The Trust Fund is comprised of cash in the sum of $2,083,000

* Revised as of 09/21/88

0066B:13

## 12.0 CLOSURE CERTIFICATION

UCAR will submit to the Ohio EPA Director and the EPA Administrator certification by UCAR and an independent registered professional engineer that the Storage Tank D HWMF has been closed in accordance with the specifications of the approved closure plan. The independent professional engineer will inspect the facility during the closure period and after all the decontamination procedures have been completed. Closure certification will be submitted within 60 days of completion of closure activities.

# APPENDIX

# APPENDIX I
# SAMPLING WORK PLAN

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APPENDIX IA

Calculation of Representative Roll-Off Container Samples

Derivation of Randomly Selected Roll-Off Container Sampling Locations


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# 1.0 INTRODUCTION

The following Sampling Work Plan was prepared for Union Carbide Corporation's UCAR Carbon Company in Lakewood, Ohio. The plan will be used to determine the disposal method for the solidified resins in Tank D and also to determine the existence of contamination at the containment structure. The results of the sampling and subsequent analysis will be used to close the hazardous waste management facility (HWMF).

This document is organized as follows: Section 2.0 describes the Solidified Resin Sampling Plan; Section 3.0, the Decontamination Rinsate Sampling Plan; and Section 4.0, the Health and Safety Plan.

# 2.0 SOLIDIFIED RESIN SAMPLING PLAN

## 2.1 Approach

Solvent-containing sludges or solids must meet treatment standards expressed as concentrations in the waste extract prior to land disposal (40CFR268.41). Union Carbide Corporation's UCAR Carbon Company (UCAR) will analyze solidified resins in Tank D to determine if this waste meets the solvent treatment standards. The solvent treatment standards (Table CCWE, 40 CFR268.41) are given in Table 2-1. Analyses for these constituents will give UCAR sufficient information to determine the proper disposal of the solidified resins in accordance with 40CFR268.30.

Sampling methodology, containers, collection, transport, and quality control are discussed in the following sections.

## 2.2 Sampling Methodology

During the removal of Tank D contents, the solidified resins will be placed in a lined roll-off container. The resins will be sampled after placement in the container. To ensure representative and random sampling of the waste, calculations recommended in the IEPA closure guidance document are presented in Appendix IA. The number of samples considered to be representative by the calculations is five. The five samples will be composited for analyses of solvent treatment standard constituents.

A random number table has been used to identify the random location of samples within the roll-off container. Appendix IA gives procedures and tables used to determine randomness. The roll-off container (20 cubic yards) was gridded into 27 units and numbered 1 through 27. Each square of the grid has a dimension of two feet. Sampling locations in the container from the use of the random number table are numbers 06, 09, 15, 16, and 26.

TABLE 2-1

SOLVENT TREATMENT STANDARDS
(40CFR268.41)

| Constituent of F001 - F005 Spent Solvent Wastes | Extract Concentrations[a] (mg/l) |
|---|---|
| Acetone | 0.59 |
| n-Butyl Alcohol | 5.00 |
| Carbon Disulfide | 4.81 |
| Carbon Tetrachloride | 0.96 |
| Chlorobenzene | 0.05 |
| Cresols (cresylic acid) | 0.75 |
| Cyclohexanone | 0.75 |
| 1,2-Dichlorobenzene | 0.125 |
| Ethyl Acetate | 0.75 |
| Ethylbenzene | 0.053 |
| Ethyl Ether | 0.75 |
| Isobutanol | 5.00 |
| Methanol | 0.75 |
| Methylene Chloride | 0.96 |
| Methyl Ethyl Ketone | 0.75 |
| Methyl Isobutyl Ketone | 0.33 |
| Nitrobenzene | 0.125 |
| Pyridine | 0.33 |
| Tetrachloroethylene | 0.05 |
| Toluene | 0.33 |
| 1,1,1-Trichloroethane | 0.41 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 0.96 |
| Trichloroethylene | 0.091 |
| Trichlorofluoromethane | 0.96 |
| Xylene | 0.15 |

(a) Extract concentrations for sludges or solids containing greater than one percent (1%) TOC.

## 2.3 Sample Containers

UCAR will instruct an EPA-approved laboratory to conduct analysis of the sample for constituents listed in the solvent treatment standard. The sample will be composited in two amber glass widemouthed eight-ounce containers. The container should have a Teflon-lined lid. The sample will be cooled to 4°C. The holding time for the sample is seven days until extraction and forty days after extraction.

The sampling containers will be purchased from an outside facility which sells new or precleaned amber bottles, or new or precleaned containers will be supplied by the sampling contractor.

## 2.4 Sample Collection

The equipment used to sample the solidified resin in the roll-off container will comply with SW 846 guidelines. A hollow stem hand auger made of stainless steel will be used to collect the samples from the roll-off container. The boring will be taken to the depth of the solidified resin. Samples will be composited for analyses in a disposable aluminum container. The composited sample will be placed in two eight ounce glass containers. All observations will be recorded in a field log book which will accompany the reported results.

All samples collected, including the quality control samples, will be refrigerated in a cooler packed with ice or an equivalent. Samples will be transported to an EPA-approved laboratory within 24 hours.

Sampling personnel will wear the necessary protective equipment as described in Section 4.0 Health and Safety Plan.

## 2.5 Sample Identification and Shipping

The sampling team will assign a discrete number to the collected sample such that it identifies the sample. As the

samples are collected, the sampling team will record the information outlined on the waste sample log sheet depicted in Figure 2-1. Concurrently, the sampling team will utilize chain-of-custody records as shown in Figure 2-2. The minimum information recorded on the chain-of-custody in addition to the signatures and dates of all custodians will include:

- o Sampling site identification,
- o Sampling date and time,
- o Identification of sample collector,
- o Sample identification, and
- o Sample description (type and quantity).

Each sample bottle will be packed in a cooler and shipped to an EPA/OEPA approved laboratory for analysis. Each cooler will be sealed with a chain-of-custody tape and the seals will be signed and dated. The chain-of-custody seal numbers will be entered on the chain-of-custody form (in the signature box). The current custodian will sign the chain-of-custody record as "Relinquished By", enter the date and time, tear off and file the back copy with the appropriate waste sampling log and place the remainder in the shipping container with the samples.

The samples will be received at the laboratory by the Laboratory Sample Custodian. He will sign the chain-of-custody record as "Received for Laboratory" and enter the date and time.

## 2.6 Quality Control Samples

In addition to the roll-off container samples, quality control samples will be collected. These samples include field blanks, trip blanks, and duplicate roll-off container samples.

One field blank and trip blank will accompany the solidified resin samples. The blank samples will contain deionized water. A duplicate solidified resin sample will be collected in exactly the same fashion as that described in Sections 2.2, 2.3, and 2.5. The bottles will be labelled as duplicates and they will be

FIGURE 2-1

WASTE SAMPLE LOG SHEET

Field Sample No.: _____

Stream No.: _____

Add'l. Stream Nos: _____

_____

Collector(s): _____

Date: _____ Time: _____

Process Source: _____

_____

_____

Waste Description: _____

_____

_____

Site Type (Lagoon, Tank, Drum, Pipe): _____

Sample Location: Bldg/Floor/Column: _____ Department: _____

Label Information: _____

_____

Sample Collection:

Equipment Used: _____

Sample Type (grab, composite, etc.): _____

_____

| Laboratory Destination | No. Sample Containers | Analyses Requested | Date Shipped |
|---|---|---|---|
| Pittsburgh | | | |
| Houston | | | |
| Concord | | | |
| Other | | | |

(See attached chain-of-custody records for more information)

Field Data:

Type of material (physical state): _____

Color: _____

Layers: _____

pH: _____

Other: _____

General Comment(s): _____

_____

_____

_____

FIGURE 2-2: CHAIN OF CUSTODY RECORD

| Client/Project Name | Project Location | ANALYSES |
|---|---|---|
| Project No. | Field Logbook No. | |
| Sampler: (*Signature*) | Chain of Custody Tape No. | |

| Sample No./ Identification | Date | Time | Lab Sample Number | Type of Sample | | | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
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| | | | | | |
|---|---|---|---|---|---|
| Relinquished by: (*Signature*) | Date | Time | Received by: (*Signature*) | Date | Time |
| Relinquished by: (*Signature*) | Date | Time | Received by: (*Signature*) | Date | Time |
| Relinquished by: (*Signature*) | Date | Time | Received for Laboratory: (*Signature*) | Date | Time |
| Sample Disposal Method: | Disposed of by: (*Signature*) | | | Date | Time |

**SAMPLE COLLECTOR**

Environmental Research and Technology, Inc.
696 Virginia Road
Concord, MA 01742
617-369-8910

**ANALYTICAL LABORATORY**

**ERT**

**Nº 5309**

retained should confirmation analysis be required. The trip blank will also accompany the samples and this blank will be analyzed for volatile organics.

# 3.0 DECONTAMINATION RINSATE SAMPLING PLAN

## 3.1 Approach

UCAR has elected to demonstrate clean closure by conducting decontamination rinsate sampling of the secondary containment structure. The method by which clean closure will be demonstrated is based on the analytical results of representative sampling of drums of collected decontamination rinsate.

The selection of the analytical constituents is based on the types of hazardous wastes stored in the area. It is UCAR's opinion that analyzing for these constituents will identify the current status of contamination at the pad (i.e. contaminated or not contaminated).

The remainder of this section provides the methodology and procedures that will be used to close the HWMF.

## 3.2 Sampling Methodology

During the decontamination process of the containment area around Tank D, the rinsate from the process will be collected and drummed. A portable pump and squeegees will be used to deliver rinsate from the containment area to drums.

To ensure that a representative sample is acquired for analysis, UCAR will withdraw samples with disposable stratified sample thiefs from 20 percent of the rinsate drums that are filled. UCAR has calculated the estimated number of drums that may be generated using documented decontamination rinsate generation rates.

The dimensions of the containment area around Tank D are 13 feet by 22 feet. Therefore, the total area of the base of the secondary containment structure is 286 square feet. The estimated area that can be decontaminated in an hour is 50 square

feet.[1] The most common steam cleaner uses approximately 200 gallons per hour.[2] Therefore, using the equation:

number of drums = pad area x rinsate generation rate/decontamination rate/55 gallon per drum

= 286 $ft^2$ X 200 gal/hr/50 $ft^2$/hr

= 1,144 gal.

= 20.80 drums

Thus, the total estimated number of drums that will be sampled is 5. Once all the drums have been filled, five of the drums will be arbitrarily selected. This will impart randomness to the sampling protocol.

UCAR will composite the decontamination rinsate into one sample. Each drum that is selected will be sampled to the bottom of the drum with a disposable stratified sampling thief. A new sampling thief will be used for each drum sampled.

Drums will be placed on pallets prior to filling with decontamination rinsate. Following decontamination of the containment area, the drums will be stored on Pads A and/or B until the analytical results have been received. If the results indicate contamination by failing the criteria listed in Section 5.0, the drums will be shipped off site as hazardous. If the drums do not indicate contamination, rinsate will be discharged to the local POTW per granted permission.

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[1] Guidance Manual: Cost Estimates for Closure and Post Closure Plans (Subparts G and H), EPA/530-SW-87-009A, Pg. 5-3.

[2] Means Site Work Cost Data; RS Means Company Inc. 1989, Pg. 14.

## 3.3 Sample Containers

The use of sample containers is a function of the type of analyses that will be conducted on the samples. UCAR will be conducting analyses for phthalate ester-phthalate acid, volatile, and semi-volatile organics as described in greater detail in the Closure Performance Standard Section of the closure plan. Therefore, three types of containers will be used for sample collection and shipment.

The containers that will be used by sampling personnel will be purchased from an outside facility which sells new or precleaned amber bottles, or new or precleaned containers will be supplied by the sampling vendor. At a minimum, the containers will have undergone a triple rinse with methanol and deionized water. The container caps will have Teflon liners. The types of containers, along with preservatives and holding times for the required analyses are presented in Table 3-1.

TABLE 3-1
SAMPLING CONTAINERS, PRESERVATIVES, AND
HOLDING TIMES FOR UCAR'S CLEAN CLOSURE ANALYSIS

| Analyte | Container | Preservative | Holding Time |
|---|---|---|---|
| Volatile organics | (2) 40ml amber glass with Teflon lined cap | Cool, 4°C, 4 drops of concentrated HCl | 14 days |
| Semi-volatile organics | 1 gal. amber glass with Teflon lined cap | Cool, 4°C | 7 days |
| Phthalate esters-phthalate acid | 1 liter amber glass with Teflon lined cap | Cool, 4°C | 7 days |

## 3.4 Sample Collection

The equipment to be utilized for the sampling of decontaminating rinse drums will concur to guidelines illustrated in EPA document SW 846. The liquid sampling device to be employed will be a stratified sampling thief. This device will be disposable and only used once, thus eliminating the need to decontaminate the sampler.

Special attention will be given to the sampling for volatile organics. These sample containers will be filled in such a manner as to preclude any air pockets or bubbles (zero head space). All other containers will be filled to capacity.

All samples collected including the quality control samples will be refrigerated in a cooler packed with ice or its equivalent and sent to an EPA approved laboratory within 24 hours.

Decontaminating and sampling personnel will wear the necessary personnel protective equipment as prescribed by Section 4.0 of this Work Plan.

## 3.5 Sample Identification and Shipping

The sampling team will assign a discrete number to the collected sample such that it identifies the sample. As the samples are collected, the sampling team will record the information outlined on the waste sample log sheet depicted in Figure 2-1. Concurrently, the sampling team will utilize chain-of-custody records as shown in Figure 2-2. The minimum information recorded on the chain-of-custody in addition to the signatures and dates of all custodians will include:

- Sampling site identification,
- Sampling date and time,
- Identification of sample collector,
- Sample identification, and
- Sample description (type and quantity).

Each sample bottle will be packed in a cooler and shipped to an EPA/OEPA approved laboratory for analysis. Each cooler will be sealed with a chain-of-custody tape and the seals will be signed and dated. The chain-of-custody seal numbers will be entered on the chain-of-custody form (in the signature box). The current custodian will sign the chain-of-custody record as "Relinquished By", enter the date and time, tear off and file the back copy with the appropriate waste sampling log and place the remainder in the shipping container with the samples.

The samples will be received at the laboratory by the Laboratory Sample Custodian. He will sign the chain-of-custody record as "Received for Laboratory" and enter the date and time.

## 3.6 Quality Control Samples

In addition to the drum samples, quality control samples will be collected. These samples include field blanks, trip blanks, and duplicate drum samples.

One field blank and trip blank will accompany the drum samples for each of the types of analyses to be conducted. The blank samples will contain deionized water. A duplicate drum sample will be collected in exactly the same fashion as that described in Sections 3.2, 3.3, and 3.5. The bottles will be labelled as duplicates and they will be retained should confirmation analysis be required. The trip blank will also accompany the drum samples and this blank will be analyzed for volatile organics.

## 4.0 HEALTH AND SAFETY PLAN

The Health and Safety Plan which follows this text is an example of the type and level of personnel protective equipment needed to sample the solidified resin contained in the roll-off and to decontaminate the containment area and sample the decontaminating rinsate.

Because the actual sampling project cannot be awarded until the closure plan is approved, a vendor cannot be selected to conduct the work. Since ENSR has not been selected as the vendor to conduct such activities, ENSR cannot guarantee that this Health and Safety Plan will be used or followed. It will be the responsibility of UCAR to ensure that the vendor selected for sampling and decontamination activities provides an adequate health and safety plan or follows the plan provided. If ENSR is selected as the sampling vendor, the following health and safety plan will be followed implicitly.

HEALTH AND SAFETY PLAN

for the

Union Carbide Corporation's UCAR Carbon Co.
(Name of Site/Facility)

Located in

Cleveland (Lakewood), Ohio
(City) (State)

Project Number: 6900-048

Document Number: 6900-048-600

Division Number: 73

Date: March 20, 1989

Prepared By: Robert Merrill

Date: March 20, 1989

Approved By: _____

Date: _____

Robert Merrill
(Health and Safety Manager)

Date: March 20, 1989

**HEALTH AND SAFETY PLAN**

for the

Union Carbide Corporation's UCAR Carbon Co.
(Name of Site/Facility)

Located in

Cleveland (Lakewood), Ohio
(City) (State)

Project Number: 6900-048

Division Number: 73

Date: March 20, 1989

**ISSUED TO:**

_____ _____
(Representing) (Name and Title)

I have received a copy of the ENSR Health and Safety Plan for this project and I have read and understand its purpose and scope.

_____
Signature

_____
Date

## PRE-JOB SAFETY MEETING

Date:_____

Attended by:

| Name | Signature |
| --- | --- |
| | |
| | |
| | |
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| | |
| | |
| | |
| | |
| | |

Topic(s) covered:

Conducted by:

_____

## SITE/PROJECT DESCRIPTION

SITE DESCRIPTION: ACTIVE? YES X NO_____

The plant is located in Cleveland (Lakewood), Ohio at West 117th Street. It began operations in 1894 at which time it produced arc carbons. Through the years, a variety of carbon products and other items have been produced such as graphite and carbon "brushes" for generators, wet and dry battery cells, vinylite, karbate (impervious graphite), boron nitride, and GRAFOIL® (flexible graphite).

SCOPE OF PROJECT/TASK:

A storage tank present on an outdoor concrete storage pad will be dismantled. It currently contains acetone liquid and phenol formaldehyde-phthalic anhydride residues. Liquid contamination will be pumped out and water will be added to cover any solid residues left in the vessel. The tank will then be inerted with dry ice prior to being cut in two horizontally.

PROPOSED ON-SITE ACTIVITIES: See above.

PROPOSED DATE(S) OF FIELD ACTIVITIES:

90 days after approval of closure plans.

PERSONNEL REQUIREMENTS:

| NAME | RESPONSIBILITY |
|---|---|
| Marc Nardulli | ENSR Project Manager |
| (to be assigned) | ENSR Field Representative |
| (Contractor) | Decontamination Work |
| | |

## HAZARD EVALUATION

MATERIALS OF CONCERN:

Acetone, phenol formaldehyde resins, and phthalic anhydride.

PHYSICAL STATE:

Acetone in liquid form and solid residues of phenol formaldehyde resins are known to exist in the storage tank. Acetone vapors can be expected in the tank head space.

HEALTH HAZARD INFORMATION;

The following TLVs represent eight hour average airborne exposures to which most workers can be exposed without adverse health effects:

Acetone - 750 ppm
Phenol - 5 ppm
Formaldehyde - 1 ppm
Phthalic anhydride - 1 ppm

Acetone is a central nervous system depressant in very high airborne concentrations (above TLV level). Since no one is to actually enter the tank, exposure to acetone above its TLV is unlikely outdoors. Skin contact should definitely be avoided, as acetone, like many solvents, can cause defatting of the skin. Phenol is readily absorbed through the skin. Some of the above compounds are potent eye and skin irritants. Formaldehyde is a strong upper respiratory tract irritant which is suspected of being a weak human carcinogen. Phthalic anhydride is another potent upper respiratory tract irritant which has been linked to skin and respiratory allergic sensitization.

CHEMICAL/PHYSICAL PROPERTIES:

Pure formaldehyde, phenol, and acetone are all water soluble or miscible in water. Phenol in pure form is a combustible liquid (flash point between 100 - 200°F). Acetone is extremely flammable with a flash point of 1.4°F.

Formaldehyde in pure form is a readily polymerizable gas at standard temperature. Phenol-formaldehyde resins, however, are likely to be in a rigid,insoluble state at the bottom of the tank.

Acetone is a relatively volatile liquid with a VP of 266 mm Hg at 77°F. Phthalic anhydride and phenol are solid compounds in pure form at stadard temperature that have vapor pressures below 0.5 mm Hg.

## Tank Contents Explosive Limits

Acetone - LEL 2.6% (26,000 ppm); UEL 12.8%
Phenol - LEL 1.7% (17,000 ppm); UEL 8.6%
Phthalic anhydride - LEL 1.7% (17,000 ppm); UEL 10.4%
Formaldehyde - LEL 7.0% (70,000 ppm); UEL 73%

TOPOGRAPHICAL HAZARDS: None known.

OPERATIONAL HAZARDS:

Entry into the storage tank is strictly prohibited. This would be a confined space entry event requiring specially trained personnel using Level B respiratory protection.

An explosive atmosphere should be assumed to exist inside the tank unless repeated testing with a LEL Meter proves otherwise. Pumps used to remove liquid/residue from the tank must be of a design approved for handling flammable liquids.

Even after liquids are removed from the tank, it is likely that flammable residues and vapors will remain. To prevent a possible explosion hazard when cutting, put enough water into the tank to cover bottom residues and then inert the tank with dry ice prior to cutting (15 lbs. dry ice per 1000 gallon volume).

## PERSONAL PROTECTION/TRAINING REQUIREMENTS

RESPIRATORY PROTECTION REQUIREMENT: (Level C/Level D)

One-half mask or full facepiece cartridge respirator with cartridges effective against both organic vapors and toxic aerosols (fumes, mists, etc). For MSA equipment, the correct cartridge would be GMA-H. Use during actual storage tank cutting and cleaning is mandatory. During other portions of work on-site, downgrading to Level D is permissible if air monitoring shows lack of airborne contaminants.

SPECIFICATIONS: See above.

MODIFICATIONS: See above.

PROTECTIVE CLOTHING REQUIREMENT:

| | |
|---|---|
| X | WORK CLOTHES/COVERALLS (long sleeved) |
| X | CHEMICAL PROTECTIVE CLOTHING. TYPE? Use Saranex if contact with tank contents cannot be avoided. |
| | WORK SHOES (steel toe/shank) |
| X | BOOTS. TYPE? Steel toe chemically resistant boots. |
| X | GLOVES. TYPE? **Vinyl Inners/Butyl Outers.** |
| X | HARD HAT |
| | FACE SHIELD |
| X | SAFETY GLASSES/GOGGLES |

MODIFICATIONS:

Chemically resistant boots over steel toe work shoes acceptable substitute. Also, full facepiece respirator acceptable substitute for safety glasses.

TRAINING REQUIREMENTS:

All site personnel will have received 40 hour training certification for hazardous waste site workers per 29 CFR 1910.120.

HAZARD COMMUNICATION:

ENSR Field Representative will conduct a pre-job health and safety meeting with Contractor employees to familiarize them with all of the health and safety plan requirements, especially the explosion hazard represented by flammable liquids in tanks.

## AIR MONITORING REQUIREMENTS

1) INSTRUMENT: HNu Photoionization Detector

2) INSTRUMENT: LEL Meter

3) INSTRUMENT: Draeger Pump/Colorimetric tubes can be used for more specific readings.

MONITORING PROCEDURE: Periodically monitor breathing zone of workers at different stages of operation (HNu has a photoionization sensitivity of 5.7 for acetone with an 11.7 eV lamp and 6.3 with the 10.2 eV lamp). You will be measuring a mix of compounds, although acetone is the most likely volatile present. A conservative action level of 10 units on HNu scale is set to protect against possibility of low TLV compounds being present. Sustained breathing zone levels below 10 units allow downgrading to Level D (no respirator) except during tank cutting and cleaning when respirators are mandatory.

Since formaldehyde may be present in the tank head space, it is recommended that Draeger tubes be used to check for breathing zone levels of formaldehyde at appropriate stages of the operation. The formaldehyde should be primarily polymerized in the resin, but its low TLV and gaseous nature at ambient temperatures makes additional checks for this product appropriate.

Proper use of the LEL meter is critical to the safe cleaning and dismantling of the storage tank on-site. Prior to cutting, the atmosphere within the tank is to be inerted by use of dry ice. The LEL meter must be used to verify the lack of $O_2$ and explosive conditions (i.e., you should not be able to get $O_2$ or explosivity readings if inerted properly) following inertion. Monitor frequently with the LEL meter from a point well outside the tank. (Note: Do not enter tank. Use tubing to access interior as needed). Beware of explosive conditions reoccurring due to residues and ventilation effects while cutting. Contractor cooperation in following these procedures is critical. Failure to do so is grounds for stopping all activity.

## DECONTAMINATION PROCEDURES

EQUIPMENT/SOLVENTS/SOLUTIONS: Alconox or equivalent

DECONTAMINATION PROCEDURE(S):

1) ITEM(S): Applies to all personal protective equipment (i.e., hard hat, boots, gloves, respirator, etc.)

PROCEDURE: Set up decon area, wash in basin of alconox solution, rinse in basin of clean water, and dry. (Note: PPE should be stored in a clean, dry location when not in use).

DISPOSAL PROCEDURE: Disposable items, such as coveralls, are to be sealed in a plastic bag and disposed of in full compliance with client procedures.

NOTE: The above specified decontamination procedures pertain to the decontamination of personal protective equipment only. Procedures for the decontamination of sampling tools or other related equipment should be specified in the subject work plan and/or QA plan.

## EMERGENCY REFERENCE

AMBULANCE: 911

POLICE: 911

FIRE: 911

HOSPITAL: Lakewood Hospital (216) 521-4200
Location: 14519 Detroit Street
Lakewood, OH 44107

DIRECTIONS TO HOSPITAL: MAP INCLUDED? No

(To be determined by ENSR Field Representative upon arrival on-site prior to start of work).

POISON CONTROL CENTER: 1/216-231-4455 (Cleveland listing)

NATIONAL RESPONSE CENTER: 1/800-424-8802

---

- ENSR REPRESENTATIVES:

| | | | |
|---|---|---|---|
| ENSR/WESTMONT, IL | | 312/887-1700 | |
| - BOB MERRILL | (HSM) | X 311 | |
| | | CBI exemption | (HOME) |
| ENSR/ACTON, MA | | | |
| - KEVIN POWERS | (HSM) | 508/635-9500 | |
| ENSR/PITTSBURGH, PA | | | |
| - MARC NARDULLI | (PM) | 412/261-2910 | |

- AGENCY REPRESENTATIVE:
- CLIENT REPRESENTATIVE:

NEAREST PHONE: To be determined prior to start of on-site activities.

# APPENDIX IA

## Calculations to Determine Number of Samples to be Representative from the Roll-Off Container (20 Cubic Yards)

Equation $n = (A\pi/GL)^{0.5}$

$n$ = number of samples

$A$ = area ($ft^2$) of roll-off container (20 cubic yards)

$GL$ = greatest length of roll-off container (5 ft. depth x 6 ft. x 18 ft.)

A = Area of Roll-Off Container

$A = W \times L$

$A = 6 \text{ ft.} \times 18 \text{ ft.}$

$A = 108 \text{ ft}^2$

Number of Samples

$n = (A\pi/GL)^{0.5}$

$= (108\pi/18)^{0.5}$

$= (339.29/18)^{0.5}$

$= (18.85)^{0.5}$

$= 4.34$ rounded up to 5

Abstract: To establish randomness in roll-off container sampling containing solidified resin from storage Tank D, a random number table was used to select sampling locations from a grid. Procedures for selecting random numbers are identified in the discussion below.

RANDOM UNITS

Use of Table. If one wishes to select a random sample of N items from a universe of M items, the following procedure may be applied. (M > N)

1. Decide upon some arbitrary scheme of selecting entries from the table. For example, one may decide to use the entries in the first line, second column, second line, third column, third line, fourth column; etc.

2. Assign numbers to each of the items in the universe from 1 to M. Thus, if M = 500, the items in the universe from 001 to 500, and therefore, each designated item is associated with a three digit number.

3. Decide upon some arbitrary scheme of selecting positional digits from each entry chosen according to Step 1. Thus, if M = 500, one may decide to use the first, third, and fourth digit of each entry selected, and as a consequence a three digit number is created for each entry choice.

4. If the number formed is less than or equal to M, the correspondingly designed item in the universe is chosen for the random sample of N items. If a number formed is greater than M or is a repeated number of one already chosen, it is passed over and the next desirable number is taken. This process is continued until the random sample of N items is selected.

From the calculation of $n = (A\pi/GL)^{0.5}$ for a representative sample, 5 was the resultant number. The roll-off container has a

## A TABLE OF 14,000 RANDOM UNITS

| Line/Col. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10480 | 15011 | 01536 | 02011 | 81647 | 91646 | 69179 | 14194 | 62590 | 36207 | 20969 | 99570 | 91291 | 90700 |
| 2 | 22368 | 46573 | 25595 | 85393 | 30995 | 89198 | 27982 | 53402 | 93965 | 34095 | 52666 | 19174 | 39615 | 99505 |
| 3 | 24130 | 48360 | 22527 | 97265 | 76393 | 64809 | 15179 | 24830 | 49340 | 32081 | 30680 | 19655 | 63348 | 58629 |
| 4 | 42167 | 93093 | 06243 | 61680 | 07856 | 16376 | 39440 | 53537 | 71341 | 57004 | 00849 | 74917 | 97758 | 16379 |
| 5 | 37570 | 39975 | 81837 | 16656 | 06121 | 91782 | 60468 | 81305 | 49684 | 60672 | 14110 | 06927 | 01263 | 54613 |
| 6 | 77921 | 06907 | 11008 | 42751 | 27756 | 53498 | 18602 | 70659 | 90655 | 15053 | 21916 | 81825 | 44394 | 42880 |
| 7 | 99562 | 72905 | 56420 | 69994 | 98872 | 31016 | 71194 | 18738 | 44013 | 48840 | 63213 | 21069 | 10634 | 12952 |
| 8 | 96301 | 91977 | 05463 | 07972 | 18876 | 20922 | 94595 | 56869 | 69014 | 60045 | 18425 | 84903 | 42508 | 32307 |
| 9 | 89579 | 14342 | 63661 | 10281 | 17453 | 18103 | 57740 | 84378 | 25331 | 12566 | 58678 | 44947 | 05585 | 56941 |
| 10 | 85475 | 36857 | 43342 | 53988 | 53060 | 59533 | 38867 | 62300 | 08158 | 17983 | 16439 | 11458 | 18593 | 64952 |
| 11 | 28918 | 69578 | 88231 | 33276 | 70997 | 79936 | 56865 | 05859 | 90106 | 31595 | 01547 | 85590 | 91610 | 78188 |
| 12 | 63553 | 40961 | 48235 | 03427 | 49626 | 69445 | 18663 | 72695 | 52180 | 20847 | 12234 | 90511 | 33703 | 90322 |
| 13 | 09429 | 93969 | 52636 | 92737 | 88974 | 33488 | 36320 | 17617 | 30015 | 08272 | 84115 | 27156 | 30613 | 74952 |
| 14 | 10365 | 61129 | 87529 | 85689 | 48237 | 52267 | 67689 | 93394 | 01511 | 26358 | 85104 | 20285 | 29975 | 89868 |
| 15 | 07119 | 97336 | 71048 | 08178 | 77233 | 13916 | 47564 | 81056 | 97735 | 85977 | 29372 | 74461 | 28551 | 90707 |
| 16 | 51085 | 12765 | 51821 | 51259 | 77452 | 16308 | 60756 | 92144 | 49442 | 53900 | 70960 | 63990 | 75601 | 40719 |
| 17 | 02368 | 21382 | 52404 | 60268 | 89368 | 19885 | 55322 | 44819 | 01188 | 65255 | 64835 | 44919 | 05944 | 55157 |
| 18 | 01011 | 54092 | 33362 | 94904 | 31273 | 04146 | 18594 | 29852 | 71585 | 85030 | 51132 | 01915 | 92747 | 64951 |
| 19 | 52162 | 53916 | 46369 | 58586 | 23216 | 14513 | 83149 | 98736 | 23495 | 64350 | 94738 | 17752 | 35156 | 35749 |
| 20 | 07056 | 97628 | 33787 | 09998 | 42698 | 06691 | 76988 | 13602 | 51851 | 46104 | 88916 | 19509 | 25625 | 58104 |
| 21 | 48663 | 91245 | 85828 | 14346 | 09172 | 30168 | 90229 | 04734 | 59193 | 22178 | 30421 | 61666 | 99904 | 32812 |
| 22 | 54164 | 58492 | 22421 | 74103 | 47070 | 25306 | 76468 | 26384 | 58151 | 06646 | 21524 | 15227 | 96909 | 44592 |
| 23 | 32639 | 32363 | 05597 | 24200 | 13363 | 38005 | 94342 | 28728 | 35806 | 06912 | 17012 | 64161 | 18296 | 22851 |
| 24 | 29334 | 27001 | 87637 | 87308 | 58731 | 00256 | 45834 | 15398 | 46557 | 41135 | 10367 | 07684 | 36188 | 18510 |
| 25 | 02488 | 33062 | 28834 | 07351 | 19731 | 92420 | 60952 | 61280 | 50001 | 67658 | 32586 | 86679 | 50720 | 94953 |
| 26 | 81525 | 72295 | 04839 | 96423 | 24878 | 82651 | 66566 | 14778 | 76797 | 14780 | 13300 | 87074 | 79666 | 95725 |
| 27 | 29676 | 20591 | 68086 | 26432 | 46901 | 20849 | 89768 | 81536 | 86645 | 12659 | 92259 | 57102 | 80428 | 25280 |
| 28 | 00742 | 57392 | 39064 | 66432 | 84673 | 40027 | 32832 | 61362 | 98947 | 96067 | 64760 | 64584 | 96096 | 98253 |
| 29 | 05366 | 04213 | 25669 | 26422 | 44407 | 44048 | 37937 | 63904 | 45766 | 66134 | 75470 | 66520 | 34693 | 90449 |
| 30 | 91921 | 26418 | 64117 | 94305 | 26766 | 25940 | 39972 | 22209 | 71500 | 64568 | 91402 | 42416 | 07844 | 69618 |
| 31 | 00582 | 04711 | 87917 | 77341 | 42206 | 35126 | 74087 | 99547 | 81817 | 42607 | 43808 | 76655 | 62028 | 76630 |
| 32 | 00725 | 69884 | 62797 | 56170 | 86324 | 88072 | 76222 | 36086 | 84637 | 93161 | 76038 | 65855 | 77919 | 88006 |
| 33 | 69011 | 65797 | 95876 | 55293 | 18988 | 27354 | 26575 | 08625 | 40801 | 59920 | 29841 | 80150 | 12777 | 48501 |
| 34 | 25976 | 57948 | 29888 | 88604 | 67917 | 48708 | 18912 | 82271 | 65424 | 69774 | 33611 | 54262 | 85963 | 03547 |
| 35 | 09763 | 83473 | 73577 | 12908 | 30883 | 18317 | 28290 | 35797 | 05998 | 41688 | 34952 | 37888 | 38917 | 88050 |
| 36 | 91567 | 42595 | 27958 | 30134 | 04024 | 86385 | 29880 | 99730 | 55536 | 84855 | 29080 | 09250 | 79656 | 73211 |
| 37 | 17955 | 56349 | 90999 | 49127 | 20044 | 59931 | 06115 | 20542 | 18059 | 02008 | 73708 | 83517 | 36103 | 42791 |
| 38 | 46503 | 18584 | 18845 | 49618 | 02304 | 51038 | 20655 | 58727 | 28168 | 15475 | 56942 | 53389 | 20562 | 87338 |
| 39 | 92157 | 89634 | 94824 | 78171 | 84610 | 82834 | 09922 | 25417 | 44137 | 48413 | 25555 | 21246 | 35509 | 20468 |
| 40 | 14577 | 62765 | 35605 | 81263 | 39667 | 47358 | 56873 | 56307 | 61607 | 49518 | 89656 | 20103 | 77490 | 18062 |
| 41 | 98427 | 07523 | 33362 | 64270 | 01638 | 92477 | 66969 | 98420 | 04880 | 45585 | 46565 | 04102 | 46880 | 45709 |
| 42 | 34914 | 63976 | 88720 | 82765 | 34476 | 17032 | 87589 | 40836 | 32427 | 70002 | 70663 | 88863 | 77775 | 69348 |
| 43 | 70060 | 28277 | 39475 | 46473 | 23219 | 53416 | 94970 | 25832 | 69975 | 94884 | 19661 | 72828 | 00102 | 66794 |
| 44 | 53976 | 54914 | 06990 | 67245 | 68350 | 82948 | 11398 | 42878 | 80287 | 88267 | 47363 | 46634 | 06541 | 97809 |
| 45 | 76072 | 29515 | 40980 | 07391 | 58745 | 25774 | 22987 | 80059 | 39911 | 96189 | 41151 | 14222 | 60697 | 59583 |
| 46 | 90725 | 52210 | 83974 | 29992 | 65831 | 38857 | 50490 | 83765 | 55657 | 14361 | 31720 | 57375 | 56228 | 41546 |
| 47 | 64364 | 67412 | 33339 | 31926 | 14883 | 24413 | 59744 | 92351 | 97473 | 89286 | 35931 | 04110 | 23726 | 51900 |
| 48 | 08962 | 00358 | 31662 | 25388 | 61642 | 34072 | 81249 | 35648 | 56891 | 69352 | 48373 | 45578 | 78547 | 81788 |
| 49 | 95012 | 68379 | 93526 | 70765 | 10593 | 04542 | 76463 | 54328 | 02349 | 17247 | 28865 | 14777 | 62730 | 92277 |
| 50 | 15664 | 10493 | 20492 | 38391 | 91132 | 21999 | 59516 | 81652 | 27195 | 48223 | 46751 | 22923 | 32261 | 85653 |

3 unit by 9 unit grid placed upon it so that the universe of numbers is 27. Therefore, a two digit number must be selected using an arbitrary scheme, in this case first and third digits in the series of numbers located in the 20th line of Table 1. The table and procedure discussion are published in the CRC Handbook of Mathematical Sciences as referenced.

Results: Table 2 identifies randomly selected numbers generated from the random number table. These numbers correspond to areas of the roll-off container. Due to homogeniety of the solidified resin, borings may not extend to the depth of the pile. Therefore alternate sample locations have been assigned for each sampling area.

TABLE 2
Randomly Selected Sampling Locations
Within the Roll-Off Container

| Sample | Location | Alternate |
|---|---|---|
| 1 | 09 | 01 |
| 2 | 06 | 19 |
| 3 | 16 | 23 |
| 4 | 15 | 25 |
| 5 | 26 | 17 |

Reference: Beyer W.M. 1980. CRC Handbook of Mathematical Sciences. CRC Press, Inc. Boca Raton, FL pgs 796-797

# APPENDIX II

72-62-7820-01

# MATERIAL SAFETY DATA SHEET

**Ashland Chemical Company**
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Ashland

001059 FAPREG P 3 PAGE: 1

THIS MSDS COMPLIES WITH 29 CFR 1910.1200 (THE HAZARD COMMUNICATION STANDARD)

**********

PRODUCT NAME: FAPREG P 3

UNION CARBIDE CORP
PO BOX 6087
CLEVELAND OH 44101

ATTN: PLANT MGR./SAFETY DIR.

05 50 017 9214660-
DATA SHEET NO: 0136523-001
LATEST REVISION DATE: 03/86-86063
PRODUCT: 3385021
INVOICE: 993373
INVOICE DATE: 04/29/86
TO: UNION CARBIDE CORP
11709 MADISON AVE
CLEVELAND OH 44102

## SECTION I-PRODUCT IDENTIFICATION

GENERAL OR GENERIC ID: SOLVENT BLEND

DOT HAZARD CLASSIFICATION: COMBUSTIBLE (173.115)

## SECTION II-COMPONENTS

| INGREDIENT | % (BY VOL) | PEL | TLV | | NOTE |
|---|---|---|---|---|---|
| ANHYDRIDE * | 1-10 | 2 | 1 | PPM | |
| ALCOHOL * | >60 | 50 | 10 | PPM - SKIN | ( 1) |
| ALDEHYDE * | 1-10 | 5 | 2 | PPM - SKIN | ( 2) |

( 1): SKIN ABSORPTION MAY POTENTIALLY CONTRIBUTE TO THE OVERALL EXPOSURE TO THIS MATERIAL. APPROPRIATE MEASURES SHOULD BE TAKEN TO PREVENT ABSORPTION SO THAT THE TLV IS NOT INVALIDATED.

( 2): SKIN ABSORPTION MAY POTENTIALLY CONTRIBUTE TO THE OVERALL EXPOSURE TO THIS MATERIAL. APPROPRIATE MEASURES SHOULD BE TAKEN TO PREVENT ABSORPTION SO THAT THE TLV IS NOT INVALIDATED.

*THE SPECIFIC CHEMICAL IDENTITY HAS BEEN WITHHELD AS A TRADE SECRET.

## SECTION III-PHYSICAL DATA

| PROPERTY | REFINEMENT | MEASUREMENT |
|---|---|---|
| BOILING POINT | FOR COMPONENT( 1-10 %) | 323.00 DEG F<br>( 161.66 DEG C)<br>@ 760.00 MMHG |
| VAPOR PRESSURE | FOR COMPONENT( 1-10%) | 1.70 MMHG<br>@ 68.00 DEG F<br>( 20.00 DEG C) |
| SPECIFIC VAPOR DENSITY | | HEAVIER THAN AIR |
| SPECIFIC GRAVITY | | GREATER THAN WATER |
| PERCENT VOLATILES | | 90-95% |
| EVAPORATION RATE | | SLOWER THAN ETHER |

## SECTION IV-FIRE AND EXPLOSION INFORMATION

FLASH POINT 100-200 DEG F
( 38-94 DEG C)

EXPLOSIVE LIMIT (LOWEST VALUE OF COMPONENT) LOWER - 1.7%

EXTINGUISHING MEDIA: WATER FOG OR CARBON DIOXIDE OR DRY CHEMICAL

HAZARDOUS DECOMPOSITION PRODUCTS: MAY FORM TOXIC MATERIALS:, CARBON DIOXIDE AND CARBON MONOXIDE, VARIOUS HYDROCARBONS, ETC.

FIREFIGHTING PROCEDURES: WEAR SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE WHEN FIGHTING FIRES.

SPECIAL FIRE & EXPLOSION HAZARDS. VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL ALONG THE GROUND OR BE MOVED BY VENTILATION AND IGNITED BY HEAT, PILOT LIGHTS, OTHER FLAMES AND IGNITION SOURCES AT LOCATIONS DISTANT FROM MATERIAL HANDLING POINT.

NEVER USE WELDING OR CUTTING TORCH ON OR NEAR DRUM (EVEN EMPTY) BECAUSE PRODUCT (EVEN JUST RESIDUE) CAN IGNITE EXPLOSIVELY.

## SECTION V-HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LEVEL: NOT ESTABLISHED FOR PRODUCT, SEE SECTION II AND SECTION IX.

EFFECTS OF ACUTE OVEREXPOSURE: FOR PRODUCT

EYES - CAN CAUSE SEVERE IRRITATION, REDNESS, TEARING, BLURRED VISION.
SKIN - CAN CAUSE REDDENING, IRRITATION, DERMATITIS, POSSIBLE SENSITIZATION.

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## SECTION V-HEALTH HAZARD DATA (CONTINUED)

BREATHING - EXCESSIVE INHALATION OF VAPORS CAN CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE, POSSIBLE UNCONSCIOUSNESS, AND EVEN ASPHYXIATION.
BREATHING - CAN CAUSE NASAL AND RESPIRATORY IRRITATION, TIGHTNESS OF CHEST, COUGHING, HEADACHE, AND SHORTNESS OF BREATH. CAN CAUSE ALLERGIC SENSITIZATION.
SWALLOWING - CAN CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, AND DIARRHEA.

FIRST AID:

IF ON SKIN: THOROUGHLY WASH EXPOSED AREA WITH SOAP AND WATER. IF IRRITATION OR RASH DEVELOPS, GET MEDICAL ATTENTION. REMOVE CONTAMINATED CLOTHING. LAUNDER CONTAMINATED CLOTHING BEFORE RE-USE.

IF IN EYES: FLUSH WITH LARGE AMOUNTS OF WATER, LIFTING UPPER AND LOWER LIDS OCCASIONALLY, GET MEDICAL ATTENTION.

IF SWALLOWED: IMMEDIATELY DRINK TWO GLASSES OF WATER AND INDUCE VOMITING BY EITHER GIVING IPECAC SYRUP OR BY PLACING FINGER AT BACK OF THROAT. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. GET MEDICAL ATTENTION IMMEDIATELY.

IF BREATHED: IF AFFECTED, REMOVE INDIVIDUAL TO FRESH AIR. IF BREATHING IS DIFFICULT, ADMINISTER OXYGEN. IF BREATHING HAS STOPPED GIVE ARTIFICIAL RESPIRATION. KEEP PERSON WARM, QUIET AND GET MEDICAL ATTENTION.

PRIMARY ROUTE(S) OF ENTRY:

INHALATION

SKIN ABSORPTION
SKIN CONTACT

EFFECTS OF CHRONIC OVEREXPOSURE: FOR PRODUCT

OVEREXPOSURE TO THIS MATERIAL (OR ITS COMPONENTS) HAS BEEN SUGGESTED AS A CAUSE OF THE FOLLOWING EFFECTS IN HUMANS:, RESPIRATORY SENSITIZATION, SKIN SENSITIZATION

## SECTION VI-REACTIVITY DATA

HAZARDOUS POLYMERIZATION: CAN OCCUR -- AVOID CONTACT WITH STRONG MINERAL ACIDS AND STRONG ORGANIC ACIDS.

STABILITY: STABLE

INCOMPATIBILITY: AVOID CONTACT WITH:, STRONG OXIDIZING AGENT ., STRONG ALKALIES., STRONG MINERAL ACIDS.

## SECTION VII-SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

SMALL SPILL: ABSORB LIQUID ON PAPER, VERMICULITE, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND TRANSFER TO HOOD.
VENTILATE AREA.

LARGE SPILL: ELIMINATE ALL IGNITION SOURCES (FLARES, FLAMES INCLUDING PILOT LIGHTS, ELECTRICAL SPARKS). PERSONS NOT WEARING PROTECTIVE EQUIPMENT SHOULD BE EXCLUDED FROM AREA OF SPILL UNTIL CLEAN-UP HAS BEEN COMPLETED. STOP SPILL AT SOURCE, DIKE AREA OF SPILL TO PREVENT SPREADING, PUMP LIQUID TO SALVAGE TANK. REMAINING LIQUID MAY BE TAKEN UP ON SAND, CLAY, EARTH, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND SHOVELED INTO CONTAINERS.
PREVENT RUN-OFF TO SEWERS, STREAMS OR OTHER BODIES OF WATER. IF RUN-OFF OCCURS, NOTIFY PROPER AUTHORITIES AS REQUIRED, THAT A SPILL HAS OCCURED.

WASTE DISPOSAL METHOD:

SMALL SPILL: ALLOW VOLATILE PORTION TO EVAPORATE IN HOOD. ALLOW SUFFICIENT TIME FOR VAPORS TO COMPLETELY CLEAR HOOD DUCT WORK. DISPOSE OF REMAINING MATERIAL IN ACCORDANCE WITH APPLICABLE REGULATIONS.

LARGE SPILL: DESTROY BY LIQUID INCINERATION.
CONTAMINATED ABSORBENT MAY BE DEPOSITED IN A LANDFILL IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

## SECTION VIII-PROTECTIVE EQUIPMENT TO BE USED

RESPIRATORY PROTECTION: IF TLV OF THE PRODUCT OR ANY COMPONENT IS EXCEEDED, A NIOSH/MSHA JOINTLY APPROVED AIR SUPPLIED RESPIRATOR IS ADVISED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. OSHA REGULATIONS ALSO PERMIT OTHER NIOSH/MSHA RESPIRATORS UNDER SPECIFIED CONDITIONS. (SEE YOUR SAFETY EQUIPMENT SUPPLIER). ENGINEERING OR ADMINISTRATIVE CONTROLS SHOULD BE IMPLEMENTED TO REDUCE EXPOSURE.

VENTILATION: PROVIDE SUFFICIENT MECHANICAL (GENERAL AND/OR LOCAL EXHAUST) VENTILATION TO MAINTAIN EXPOSURE BELOW TLV(S).

PROTECTIVE GLOVES: WEAR RESISTANT GLOVES SUCH AS:, NEOPRENE

EYE PROTECTION: CHEMICAL SPLASH GOGGLES IN COMPLIANCE WITH OSHA REGULATIONS ARE ADVISED; HOWEVER, OSHA REGULATIONS ALSO PERMIT OTHER TYPE SAFETY GLASSES. (CONSULT YOUR SAFETY EQUIPMENT SUPPLIER)

OTHER PROTECTIVE EQUIPMENT: TO PREVENT REPEATED OR PROLONGED SKIN CONTACT, WEAR IMPERVIOUS CLOTHING AND BOOTS.

72-62-7820-01

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**MATERIAL SAFETY DATA SHEET**

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## DEFINITIONS

THIS DEFINITION PAGE IS INTENDED FOR USE WITH MATERIAL SAFETY DATA SHEETS SUPPLIED BY THE ASHLAND CHEMICAL COMPANY. QUESTIONS CONCERNING THESE SHEETS SHOULD BE DIRECTED TO THE ENVIRONMENTAL AND OCCUPATIONAL SAFETY DEPARTMENT.

### SECTION I
### PRODUCT IDENTIFICATION

PRODUCT CLASS: GENERAL OR GENERIC IDENTIFICATION.

HAZARDOUS CLASSIFICATION: PRODUCT MEETS DOT CRITERIA FOR HAZARDS LISTED.

### SECTION II
### HAZARDOUS COMPONENTS

A HAZARDOUS INGREDIENT IS ONE WHICH MEETS ONE OR MORE OF THE FOLLOWING CRITERIA:

1. IT IS LISTED IN THE ANNUAL REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES, OR IT IS KNOWN TO BE TOXIC WITHIN THE PARAMETERS OF THAT REGISTRY.

AND/OR

2. IT HAS A OSHA ESTABLISHED, 8-HOUR TIME-WEIGHTED AVERAGE PERMISSABLE EXPOSURE LIMIT (PEL) OR ACCEPTABLE CEILING (C), OR AN AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS' (ACGIH) THRESHOLD LIMIT VALUE, AND BY NATURE OF THE PRODUCT OR ITS KNOWN USE, IT IS LIKELY TO BECOME AIRBORNE.

AND/OR

3. IT CONTRIBUTES TO ONE OR MORE OF THE FOLLOWING HAZARDS OF THE PRODUCT:

   A. FLASHPOINT BELLOW 200 DEG F (CC), OR SUBJECT TO SPONTANEOUS HEATING OR DECOMPOSITION.

   B. CAUSES SKIN BURNS. (DOT)

   C. STRONG OXIDIZING AGENT. (DOT)

   D. SUBJECT TO HAZARDOUS POLYMERIZATION.

EACH INGREDIENT MEETING ONE OR MORE OF THE ABOVE CRITERIA IS LISTED IN SECTION II IF PRESENT AT A LEVEL AT LEAST GREATER THAN ONE PERCENT. INGREDIENTS WHICH ARE CLAIMED TO BE CARCINOGENS, TERATOGENS, MUTAGENS, OR CAUSATIVE AGENTS OF OTHER REPRODUCTIVE DISORDERS ARE LISTED IF KNOWN OR BELIEVED TO BE PRESENT, PROVIDED THAT THE DATA SUPPORTING SUCH CLAIMS IS CONSIDERED VALID.

EACH HAZARDOUS INGREDIENT IS LISTED BY CHEMICAL, GENERIC, OR PROPRIETARY NAME. ITS LEVEL IN THE PRODUCT IS EXPRESSED AS 1% OR LESS, 1-10%, 10-30%, 30-60%, OR GREATER THAN 60%, OR BY OTHER MEANS.

### SECTION III
### PHYSICAL DATA

INITIAL BOILING POINT: IF LIQUID AT 68 DEG F.

VAPOR PRESSURE: IF LIQUID AT 68 DEG F OR WHICH SUBLIMES.

VAPOR DENSITY: FOR VOLATILE PORTION OF PRODUCT.

SPECIFIC GRAVITY: IF SPECIFIC GRAVITY OF PRODUCT IS NOT KNOWN, INDICATED AS <1, =1, OR >1.

PERCENT VOLATILES: PERCENTAGE OF MATERIAL WITH INITIAL BOILING POINT BELOW 425 DEG F.

EVAPORATION RATE: INDICATED AS FASTER OR SLOWER THAN ETHYL ETHER, UNLESS STATED.

### SECTION IV
### PRODUCT IDENTIFICATION

FLASH POINT: CLOSED CUP.

LOWER EXPLOSION LIMIT: INDICATED FOR COMPONENT WITH LOWEST VALUE.

HAZARDOUS DECOMPOSITION PRODUCTS: KNOWN HAZARDOUS PRODUCTS RESULTING FROM HEATING, BURNING, ETC., OR REACTED RAW MATERIALS WHICH MAY ARISE THROUGH HEATING, BURNING, ETC.

SPECIAL FIREFIGHTING PROCEDURES: INDICATES EQUIPMENT TO PROTECT FIREMEN FROM TOXIC PRODUCTS OF COMBUSTION OR IF WATER IS NOT TO BE USED.

UNUSUAL FIRE AND EXPLOSION HAZARDS: HAZARDS NOT COVERED BY OTHER SECTIONS OF THIS REPORT ARE SHOWN HERE.

### SECTION V
### HEALTH HAZARD DATA

RECIPIENTS OF THIS DATA SHEET SHOULD CONSULT THE OSHA SAFETY AND HEALTH STANDARDS (29 CFR 1910), PARTICULARLY SUBPART G - OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL, AND SUBPART I - PERSONAL PROTECTIVE EQUIPMENT, FOR GENERAL GUIDANCE ON CONTROL OF POTENTIAL OCCUPATIONAL HEALTH HAZARDS.

PERMISSIBLE EXPOSURE LEVEL: OSHA ESTABLISHED PEL--IF NONE AVAILABLE, ADOPTED VALUE.

EFFECTS OF OVEREXPOSURE: GIVEN IN GENERAL TERMS; LOCAL AND SYSTEMIC EFFECTS TO THE EYES, SKIN, IF MATERIAL IS INHALED, UNLESS NOT APPLICABLE DUE TO PHYSICAL FORM OF PRODUCT.

### SECTION VI
### REACTIVITY DATA

HAZARDOUS POLYMERIZATION: CONDITIONS TO AVOID HAZARDOUS POLYMERIZATION RESULTING IN A LARGE RELEASE OF ENERGY.

STABILITY: CONDITIONS TO AVOID IF UNSTABLE UNDER NORMAL CIRCUMSTANCES.

INCOMPATIBILITY: MATERIALS TO AVOID.

### SECTION VII
### SPILL OR LEAK PROCEDURES

REASONABLE PRECAUTIONS TO BE TAKEN AND THE METHODS OF CLEAN-UP TO BE USED IN THE EVENT OF SPILLAGE OF THE PRODUCT. CONSULT FEDERAL, STATE AND LOCAL REGULATIONS FOR ACCEPTED PROCEDURES AND ANY REPORTING OR NOTIFICATION REQUIREMENTS.

### SECTION VIII
### PROTECTIVE EQUIPMENT TO BE USED

THIS SECTION INDICATES PROTECTIVE EQIUPMENT TO BE USED WHEN HANDLING THE PRODUCT.

### SECTION IX
### SPECIAL PRECAUTIONS OR OTHER COMMENTS

THIS SECTION IS TO COVER ANY RELEVANT POINTS NOT PREVIOUSLY MENTIONED.

## ADDITIONAL COMMENTS

ASHLAND WISHES TO INFORM YOU THAT SERIOUS ACCIDENTS HAVE RESULTED FROM THE MISUSE OF "EMPTIED" CONTAINERS (DRUMS, 1 AND 5 GALLON PAILS, ETC.). REFER TO SECTIONS IV AND IX.

WE RECOMMEND THAT CONTAINERS BE EITHER PROFESSIONALLY RECONDITIONED FOR REUSE BY CERTIFIED FIRMS OR PROPERLY DISPOSED OF BY CERTIFIED FIRMS TO HELP REDUCE THE POSSIBILITY OF AN ACCIDENT. DISPOSAL OF CONTAINERS SHOULD BE IN ACCORDANCE WITH APPLICABLE LAWS AND REGULATIONS. "EMPTY" DRUMS SHOULD NOT BE GIVEN TO INDIVIDUALS.

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## SECTION IX-SPECIAL PRECAUTIONS OR OTHER COMMENTS

CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED. SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, AND/OR SOLID), ALL HAZARD PRECAUTIONS GIVEN IN THE DATA SHEET MUST BE OBSERVED.

THE INFORMATION ACCUMULATED HEREIN IS BELIEVED TO BE ACCURATE BUT IS NOT WARRANTED TO BE WHETHER ORIGINATING WITH THE COMPANY OR NOT. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE, AND SUITABLE TO THEIR CIRCUMSTANCES.

# MATERIAL SAFETY DATA SHEET

EFFECTIVE DATE: July 1, 1981

## I. PRODUCT IDENTIFICATION

| | | | |
|---|---|---|---|
| PRODUCT NAME: | UCAR® Phenolic Resin BRL-1100 | | |
| CHEMICAL NAME: | – – | CHEMICAL FAMILY: | Phenolic resin |
| FORMULA: | – – | MOLECULAR WEIGHT: | – – |
| SYNONYMS: | – – | | |
| DEPARTMENT OF TRANSPORTATION | HAZARD CLASSIFICATION | Corrosive material | |
| | SHIPPING NAME | Corrosive liquid, NOS | |
| CAS # 9003-35-4 | CAS NAME | Phenol, polymer with formaldehyde | |

## II. PHYSICAL DATA

| | | | |
|---|---|---|---|
| BOILING POINT, 760 mm Hg | 100 °C (Water) | FREEZING POINT | < 0 °C (Water) |
| SPECIFIC GRAVITY ($H_2O$ = 1) | 1.195 to 1.205 at 25 °C | VAPOR PRESSURE at 20 °C | < 15 mm (Water) |
| VAPOR DENSITY (air = 1) | 0.6 (Water) | SOLUBILITY IN WATER, % by wt. | < 1.0 |
| PER CENT VOLATILES BY VOLUME | 32 to 36 | EVAPORATION RATE (Butyl Acetate = 1) | 0.3 (Water) |
| APPEARANCE AND ODOR | Liquid. Phenolic color and odor. | | |

## III. INGREDIENTS

| MATERIAL | % | TLV (Units) | HAZARD |
|---|---|---|---|
| Phenolic resin | 64 to 68 | None established | None currently known |
| Phenol | < 15 | 5 ppm (skin) | Toxic |
| Formaldehyde | < 5 | 2 ppm ceiling ACGIH<br>3 ppm OSHA | Toxic |
| | | | |

## IV. FIRE AND EXPLOSION HAZARD DATA

| | | | | | |
|---|---|---|---|---|---|
| FLASH POINT [test method(s)] | Not applicable | | | | |
| FLAMMABLE LIMITS IN AIR, % by volume | | LOWER | Not determined (Nonvolatile fluid) | UPPER | Not determined (Nonvolatile fluid) |

| | |
|---|---|
| EXTINGUISHING MEDIA | Use water spray, carbon dioxide, dry chemical, or alcohol-type or universal-type foams. Apply by manufacturer's recommended technique. |
| SPECIAL FIRE FIGHTING PROCEDURES | Use supplied breathing air and protective clothing. Burning and elevated temperatures can produce carbon monoxide, carbon dioxide, phenol vapors and formaldehyde vapors. |
| UNUSUAL FIRE AND EXPLOSION HAZARDS | None |

## EMERGENCY PHONE

304/744-3487

This number is available days, nights, weekends, and holidays.

## HEALTH HAZARD DATA

TLV AND SOURCE: **See Section III. Values from ACGIH (1979) and OSHA 29 CFR § 1910.1000, Table Z-1 and Z-2.**

| ACUTE EFFECTS OF OVEREXPOSURE | |
|---|---|
| SWALLOWING | Nausea, vomiting, abdominal pain, collapse. May cause liver and kidney injury. |
| SKIN ABSORPTION | Extensive and prolonged contact may result in systemic illness. |
| INHALATION | Vapors are irritating to nose, throat, and chest. May cause chest pain and symptoms of bronchitis. |
| SKIN CONTACT | Causes burns. |
| EYE CONTACT | Causes severe injury. |
| CHRONIC EFFECTS OF OVEREXPOSURE | None currently known. |
| OTHER HEALTH HAZARDS | Prolonged or repeated contact may cause sensitization. Avoid breathing vapors. Vapors contain formaldehyde. Exhaust ventilation must be used. |

| EMERGENCY AND FIRST AID PROCEDURES: | |
|---|---|
| S. .OWING | Drink two glasses of water and induce vomiting by putting finger down throat. Call a physician. |
| SKIN | Remove contaminated clothing. Wash promptly with plenty of soap and water. Call a physician. |
| INHALATION | Remove to fresh air. Give artificial respiration if not breathing. Give oxygen if breathing is difficult. Call a physician. |
| EYES | Immediately flush eyes with plenty of water for 15 minutes. Call a physician. |

NOTES TO PHYSICIAN

No specific antidote is known.
Treatment is directed toward control of symptoms and the clincal condition.

## VI. REACTIVITY DATA

| STABILITY | | CONDITIONS TO AVOID | None |
|---|---|---|---|
| UNSTABLE | STABLE | | |
| – – | √ | | |

| | |
|---|---|
| INCOMPATIBILITY (materials to avoid) | Strong acids |
| HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS | Burning and elevated temperatures can produce carbon monoxide, carbon dioxide, phenol vapors, and formaldehyde vapors. |

| HAZARDOUS POLYMERIZATION | | CONDITIONS TO AVOID | None |
|---|---|---|---|
| May Occur | Will not Occur | | |
| – – | √ | | |

## VII. SPILL OR LEAK PROCEDURES

| | |
|---|---|
| STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED | Wear suitable protective clothing. Collect for disposal; see Section IX. |
| WASTE DISPOSAL METHOD | Incinerate in a furnace where permitted under Federal, State, and local regulations. |

## VIII. SPECIAL PROTECTION INFORMATION

| | | | |
|---|---|---|---|
| RESPIRATORY PROTECTION (specify type) | Self-contained breathing apparatus in high concentrations. | | |
| VENTILATION | Special (local) ventilation may be needed to control phenol and formaldehyde vapors below their Threshold Limit Values. | | |
| PROTECTIVE GLOVES | Plastic or rubber | EYE PROTECTION | Monogoggles |
| OTHER PROTECTIVE EQUIPMENT | Eye bath, safety shower | | |

## IX. SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Do not get in eyes, on skin, on clothing.
Avoid breathing vapors.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.

FOR INDUSTRY USE ONLY

OTHER PRECAUTIONS

Phenol causes taste and odor problems in water at very low concentrations; spilled material should not be allowed to drain into waterways.